JVC

SERVICE MANUAL

VIDEO CASSETTE RECORDER VHS

HR-7610MSB

SPECIFICATIONS

General
Power requirement : 220 V∿, 50/60 Hz
Power consumption : 45 watts (60 W with camera)
Camera connector output : 12 V ⎓ , 1 A max
Temperature : Operating: 5°C to 40°C
Storage: –20°C to 60°C
Operating position : Horizontal only
Weight : 12 kg
Dimensions : 460(W) x 154(H) x 371(D) mm

Tape deck section
Format : VHS standard
Video signal system : PAL and SECAM colour and CCIR monochrome signals, 625 lines
NTSC (4.43 MHz) colour and EIA monochrome signals, 525 lines
Video recording system : Luminance: FM recording
Colour: Phase shift & converted subcarrier direct recording (PAL/NTSC)
1/4 frequency count down and direct recording (SECAM)
Scanning system : Rotary, slant azimuth, two-head helical scan system
Tape width : 12.65 mm
Tape speed : 23.39 mm/sec (PAL/SECAM)
33.35 mm/sec (NTSC)
Playing time : 240 minutes with E-240 (PAL/SECAM)
160 minutes with T-160 (NTSC)
Video input : 0.5 to 2.0 Vp-p/75 ohms
Video output : 1.0 Vp-p, 75 ohms
Video S/N : 43 dB (PAL/SECAM), 45 dB (NTSC)
(with Rohde & Schwarz noise meter)
Resolution of picture : More than 250 lines (PAL)
More than 240 lines (NTSC/SECAM)
Audio mic input : –67 dBs/high impedance, unbalanced
Audio line input : –20 dBs/50 k-ohms, unbalanced
Audio output level : –6 dBs, high impedance load
Audio output impedance : 1 k-ohm, unbalanced
Audio frequency range : 70 Hz – 10 kHz
Audio S/N : More than 48 dB (Noise reduction on)

TV tuner/RF section
Channel storage capacity : SECAM 4 channels
PAL 8 channels
Antenna input : VHF band I, PAL 47 – 118 MHz
VHF band III, PAL 118 – 300 MHz
(SECAM channels 1 – 6)
UHF band IV/V, PAL 470 – 862 MHz
(SECAM channels 21 – 69)
Antenna output : UHF channels 32 – 40 (Adjustable)

Digital clock/timer
Clock display : 24-hour fluorescent digital display with day indication
Reference frequency : Quartz controlled
Start time setting : Within 2 weeks
Programming capacity : 8 programmes

Accessories : Antenna cable
Video cassette
Infrared remote control unit
"R6" battery x 2
Metal latch
Optional accessory : Wired remote control unit
(RM-P73U)

Design and specifications subject to change without notice.

No. 8340
April 1984

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Important Safety Precautions

Prior to shipment from the factory, JVC products are strictly inspected to conform with the recognized product safety and electrical codes of the countries in which they are to be sold. However, in order to maintain such compliance, it is equally important to implement the following precautions when a set is being serviced.

● Precautions during Servicing

1. Locations requiring special caution are denoted by labels and inscriptions on the cabinet, chassis and certain parts of the product. When performing service, be sure to read and comply with these and other cautionary notices appearing in the operation and service manuals.

2. Parts identified by the ⚠ symbol and shaded (▩) parts are critical for safety.
   Replace only with specified part numbers.

   Note: **Parts in this category also include those specified to comply with X-ray emission standards for products using cathode ray tubes and those specified for compliance with various regulations regarding spurious radiation emission.**

3. Use specified internal wiring. Note especially:
   1) Wires covered with PVC tubing
   2) Double insulated wires
   3) High voltage leads

4. Use specified insulating materials for hazardous live parts. Note especially:
   1) Insulation Tape
   2) PVC tubing
   3) Spacers
   4) Insulation sheets for transistors

5. When replacing AC primary side components (transformers, power cords, noise blocking capacitors, etc.) wrap ends of wires securely about the terminals before soldering.

6. Observe that wires do not contact heat producing parts (heatsinks, oxide metal film resistors, fusible resistors, etc.)

7. Check that replaced wires do not contact sharp edged or pointed parts.

8. When a power cord has been replaced, check that 10–15 kg of force in any direction will not loosen it.

9. Also check areas surrounding repaired locations.

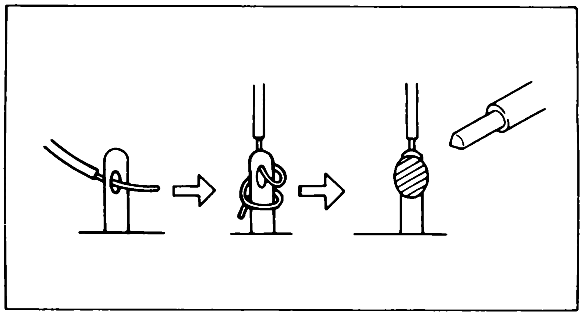


Fig. 1

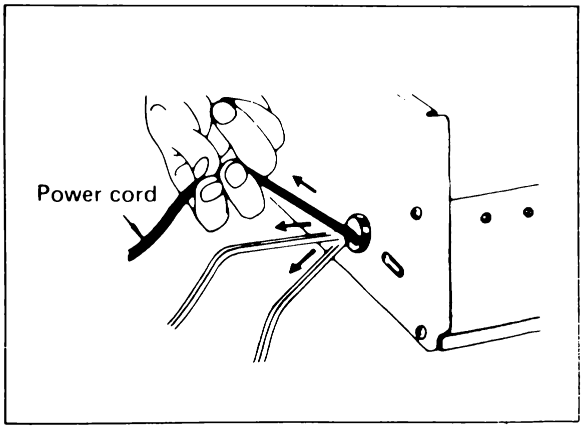


Fig. 2

10. Products using cathode ray tubes (CRTs)
    In regard to such products, the cathode ray tubes themselves, the high voltage circuits, and related circuits are specified for compliance with recognized codes pertaining to X-ray emission. Consequently, when servicing these products, replace the cathode ray tubes and other parts with only the parts specified. Under no circumstances attempt to modify these circuits. Unauthorized modification can increase the high voltage value and cause X-ray emission from the cathode ray tube.

11. Crimp type wire connector

In such cases as when replacing the power transformer in sets where the connections between the power cord and power transformer primary lead wires are performed using crimp type connectors, if replacing the connectors is unavoidable, in order to prevent safety hazards, perform carefully and precisely according to the following steps.

1. Connector part number : E03830-001
2. Required tool : Connector crimping tool of the proper type which will not damage insulated parts.
3. Replacement procedure
   1) Remove the old connector by cutting the wires at a point close to the connector. Important : Do not reuse a connector (discard it).
   2) Strip about 15 mm of the insulation from the ends of the wires. If the wires are stranded, twist the strands to avoid frayed conductors.
   3) Align the lengths of the wires to be connected. Insert the wires fully into the connector.
   4) As shown in Fig. 6, use the crimping tool to crimp the metal sleeve at the center position. Be sure to crimp fully to the complete closure of the tool.
   5) **Check the four points noted in Fig. 7.**

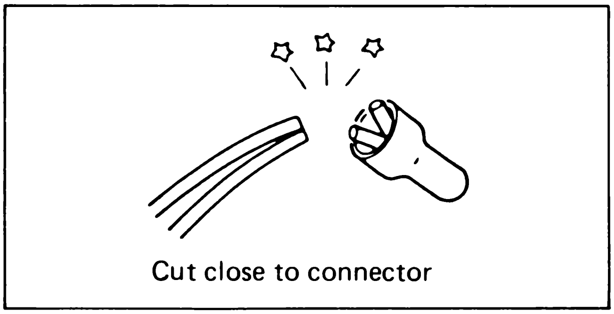

Cut close to connector

Fig. 3

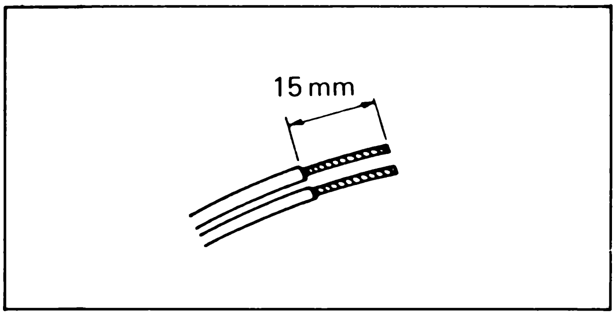


Fig. 4

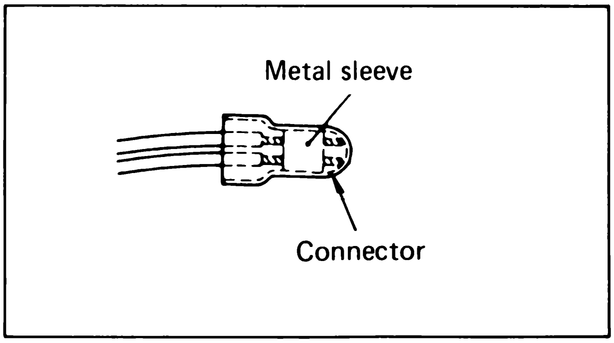

Metal sleeve
Connector

Fig. 5

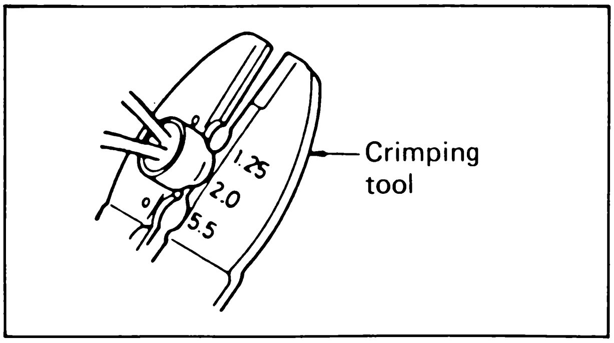

1.25
2.0
5.5
Crimping tool

Fig. 6

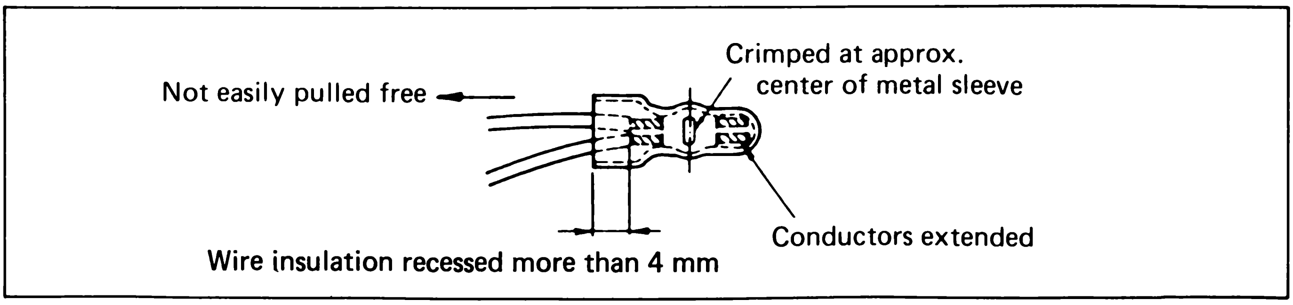

Crimped at approx. center of metal sleeve
Not easily pulled free
Conductors extended
Wire insulation recessed more than 4 mm

Fig. 7

●Safety Check after Servicing

Examine the area surrounding the repaired location for damage or deterioration. Observe that screws, parts and wires have been returned to original positions. Afterwards, perform the following tests and confirm the specified values in order to verify compliance with safety standards.

1. **Insulation resistance test**
   Confirm the specified insulation resistance or greater between power cord plug prongs and externally exposed parts of the set (RF terminals, antenna terminals, video and audio input and output terminals, microphone jacks, earphone jacks, etc.). See table below.

2. **Dielectric strength test**
   Confirm specified dielectric strength or greater between power cord plug prongs and exposed accessible parts of the set (RF terminals, antenna terminals, video and audio input and output terminals, microphone jacks, earphone jacks, etc.) See table below.

3. **Clearance distance**
   When replacing primary circuit components, confirm specified clearance distance (d),(d') between soldered terminals, and between terminals and surrounding metallic parts. See table below.

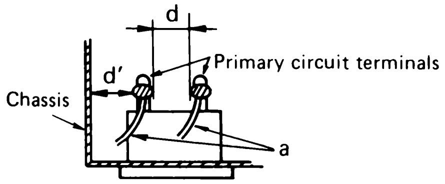


Fig. 8

Table 1: Ratings for selected areas

AC Line Voltage	Region	Insulation Resistance	Dielectric Strength	Clearance Distance(d),(d')
100 V	Japan	≧ 1 MΩ/500 V DC	1 kV 1 minute	≧ 3 mm
110 to 130 V	USA & Canada	– – –	900 V 1 minute	≧ 3.2 mm
* 110 to 130 V 200 to 240 V	Europe Australia	≧ 10 MΩ/500 V DC	4 kV 1 minute	≧ 6 mm (d) ≧ 8 mm (d') (a: Power cord)

* Class Π model only.

Note. This table is unofficial and for reference only. Be sure to confirm the precise values for your particular country and locality.

4. **Leakage current test**
   Confirm specified or lower leakage current between B(earth ground, power cord plug prongs) and externally exposed accessible parts (RF terminals, antenna terminals, video and audio input and output terminals, microphone jacks, earphone jacks, etc.).

   Measuring Method: (Power ON)
   Insert load Z between B(earth ground,power cord plug prongs) and exposed accessible parts. Use an AC voltmeter to measure across both terminals of load Z. See figure and following table.

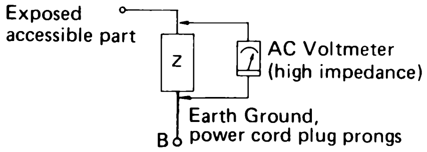
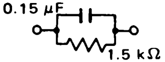
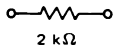
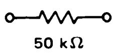


Fig. 9

Table 2: Leakage current ratings for selected areas

AC Line Voltage	Region	Load Z	Leakage Current (i)	Earth Ground (B) to:
100 V	Japan		i ≦ 1m A rms	Exposed accessible parts
110 to 130 V	USA & Canada		i ≦ 0.5m A rms	Exposed accessible parts
110 to 130 V 200 to 240 V	Europe Australia		i ≦ 0.7 m A peak i ≦ 2 m A dc	Antenna earth terminals
			i ≦ 0.7 m A peak i ≦ 2 m A dc	Other terminals

Note. This table is unofficial and for reference only. Be sure to confirm the precise values for your particular country and locality.

HR-7610MSB

INSTRUCTIONS

For reference, the text of the instruction booklet of this model is reproduced in the following pages.
Numbering of the pages also corresponds with that of the booklet.

Thank you for purchasing the JVC HR-7610MSB Video Cassette Recorder. This unit conforms to the VHS video format developed for full home entertainment by JVC to provide high-quality recording and playback capability.

Besides the full complement of advanced features, the HR-7610MSB incorporates the circuitry required to record or play back the PAL, SECAM, or NTSC (4.43 MHz) signals. Since a dual-tuner conforming both to the wide-band PAL B/G system (Continental PAL) and the SECAM L system (French SECAM) is built in, those who live in areas where TV broadcasts of both standards are receivable can directly record those broadcasts without connecting any separate tuner.

To obtain the best results and avoid malfunctions, please read this instruction booklet carefully and thoroughly before using your HR-7610MSB.

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VHS
PAL SECAM NTSC4.43

Only cassettes marked "VHS" can be used with this video cassette recorder.

WARNING: TO PREVENT FIRE OR SHOCK HAZARD, DO NOT EXPOSE THIS UNIT TO RAIN OR MOISTURE.

CAUTION

Dangerous voltage inside. Refer internal servicing to qualified service personnel. To prevent electric shock or fire hazard, remove the power cord from the AC outlet prior to connecting or disconnecting any signal lead or aerial.

POWER SWITCH

The mains switch is located on the rear connector panel. Setting this switch to ARRET (off) removes all applied power from the set including the timer clock. Switching on or off the recorder section is performed with the secondary power switch on the front panel, which has three positions labelled "ENR. PROG.", "MARCHE" and "ARRET" (referred to as "sub-power switch").

IMPORTANT: It is permissible to record television programmes only in the event that third party copyrights and other rights are not violated.

NOTE: The rating plate and the safety caution are on the rear of the unit.

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STRUCTURE OF THIS MANUAL

Your new HR-7610MSB may be somewhat complicated to operate at first because of its highly advanced features. In order to help you master the operation of this unit, this booklet is divided into six parts. The ideas and contents of each part are described here. So first read this page and then you can start referring to any part depending on your situation.

PART I: GENERAL DESCRIPTION

This introduction to your new machine contains the handling precautions you must observe to be assured of safe operation, and a concise list of the HR-7610MSB features and capabilities. Also included is a guide to selecting the appropriate circuitry for the broadcasting standard in your area, or the type of camera or tape you're using. For quick reference as you read the rest of this booklet, you will also find detailed drawings and a brief explanation of all controls and connectors.

FEATURES 3
PRECAUTIONS 3
IMPORTANT INFORMATION ON COLOUR SYSTEM SELECTION 4
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PART II: PREPARATIONS

All that you have to do before actual use of this machine is described in Part II. First you have to connect this recorder to your TV set. Then you must pre-tune the built-in tuner to specific stations in your area. Also, since this unit has a built-in timer which also functions as an ordinary clock, you may wish to set it to the correct time, even though you are still not going to use its timer facility.

HOW TO CONNECT THE HR-7610MSB TO YOUR TV SET 13
HOW TO SET YOUR VIDEO CHANNEL 14
HOW TO PRE-TUNE THE BUILT-IN TUNER 15
HOW TO SET THE CLOCK 17

PART III: BASIC OPERATION

After the preparations, you are ready to record a TV programme while watching it or watching another one on a different channel, and then play back the recorded tape at any convenient time. This is the basic function of any deck-type video recorder. Although this machine is full of convenient features, the first step to familiarize yourself with the working principle of this machine may be to master this procedure. With this in mind, this section is devoted to step-by-step explanation of this basic operation, beginning with "how to insert a cassette".

HOW TO LOAD AND UNLOAD THE VIDEO CASSETTE 18
HOW TO RECORD A TV PROGRAMME WHILE WATCHING IT 19
HOW TO RECORD ONE TV PROGRAMME WHILE WATCHING ANOTHER 20
HOW TO RECORD A TV PROGRAMME FROM A MONITOR-RECEIVER 20
HOW TO PLAY BACK THE VIDEO CASSETTE 21
HOW TO ENJOY VARIABLE-SPEED PLAYBACK 22

PART IV: ADVANCED USAGE

One big feature of the HR-7610MSB is its timer recording facility. You can reserve recordings at any time within two weeks in advance for as many as eight TV programmes either individually, in series or in weekly repetitions.
Also, since the HR-7610MSB is provided with a camera connector, JVC video cameras can be directly connected to make your own video movies easily. Its audio dubbing facility enables replacing the recorded sound with another soundtrack of your choice. If you are ready to fully utilize these facilities, refer to Part IV.

HOW TO PRESET THE TIMER FOR UNATTENDED RECORDING 23
HOW TO SET THE RECORDER FOR UNATTENDED RECORDING 24
FOR A BETTER UNDERSTANDING OF THE PROGRAMMABLE TIMER 25
HOW TO USE THE SLEEP TIMER FACILITY 26
HOW TO RECORD WITH A VIDEO CAMERA 27
HOW TO PERFORM AUDIO DUBBING 28
HOW TO PERFORM INSERT EDITING 29

PART V: ADDITIONAL FACILITIES

This is a cross-reference chapter which contains detailed description of several convenient facilities such as the cue and counter search functions for tape indexing, etc. These functions are briefly mentioned in other parts of this booklet when needed. However, refer to Part V whenever you wish to know the details of these functions, following the cross-reference indications.
Another subject of this section is the infrared remote control unit. Since most buttons on the remote control unit function in the same way as the corresponding buttons on the recorder, there may be no problem in using it. However, necessary precautions are mentioned in this section, so please refer to it before you start using the remote control unit.

HOW TO USE THE TAPE COUNTER 31
HOW TO USE THE SEARCH SWITCH 31
HOW TO USE THE TRACKING CONTROLS 31
HOW TO USE THE REMOTE CONTROL UNIT 32

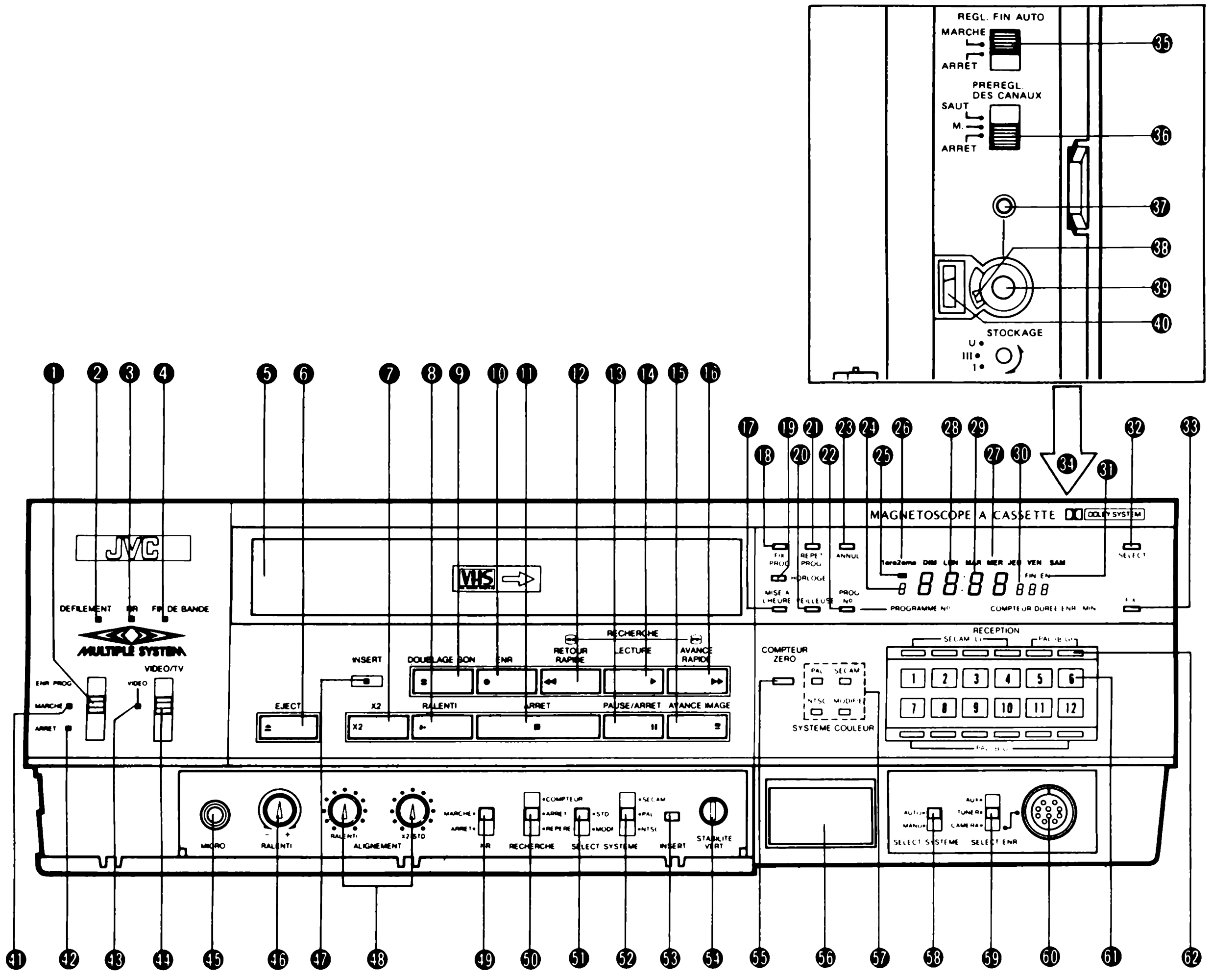
PART VI: SUPPLEMENTS

A simple troubleshooting guide, hints for maintenance and countermeasures for some problems with pictures on the TV screen are put together in this section. When you encounter some strange phenomena in using the HR-7610MSB, reference to Part VI may help you.

ADJUST YOUR TV RECEIVER WHEN 33
HEAD CLEANING 33
IN CASE OF DIFFICULTY 34
SPECIFICATIONS 34

PART I

GENERAL DESCRIPTION



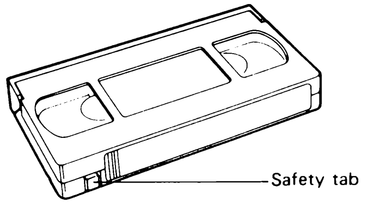
FEATURES

- PAL, SECAM and NTSC 4.43 MHz recording and playback circuitry.
- Built-in 12-channel pre-tunable dual-tuner (PAL B/G and SECAM L); French SECAM broadcasts can be recorded using the channels 1 through 4 and Continental PAL broadcasts can be recorded using the channels 5 through 12. The PAL tuner is built to wide-band tuner specifications.
- Motorized front-loading cassette system.
- Infrared remote control unit.
- Microprocessor-based, fully electronic logic control system.
- Shuttle search function for quick location of a particular segment in both forward and reverse directions (at about 9 times normal speed with PAL/SECAM tapes and about 7 times normal speed with NTSC tapes.)
- Variable-speed playback in double-speed, slow-motion, freeze-frame and frame-advance modes.
- Fluorescent tube display for indicating tape counting, clock time and programmed timer recording data.
- Multi-programmable timer for presetting up to 8 programmes within a 14-day period.
- Clock/timer memory hold system with a back-up time of about 10 minutes.
- Automatic edit control system which operates on the principle of back-space editing minimizes picture distortion between separately recorded segments.
- Simplified insert editing function which permits different programme segments to be inserted on a pre-recorded tape with minimized distortion at both the start and end of the new, added material.
- Newly-developed brushless, quartz-locked direct-drive drum motor plus motors for capstan, reel, cassette loading and tape loading provide greater stability and higher reliability.
- Simplified mechanism and improved performance in addition to stable tape transport and easy alignment via five-motor system.
- Built-in Dolby* noise reduction system for improved sound quality.
- Advanced mechanisms including cue and counter search for speedy location of a specific programme and tape-end automatic rewind.
- Tape-end indicator warning in two steps.
- Direct camera connection to the front panel connector.
- Sleep timer facility for recording.
- Improved clock accuracy through use of a quartz oscillator.
- Dimmer control for the entire fluorescent display.
- Tape-run indicator.
- Automatic channel lock mechanism.
- Simplified tuning system.

PRECAUTIONS

Handling and storage

- Avoid using the HR-7610MSB under the following conditions:
  - extremely hot, cold or humid places,
  - dusty places,
  - near appliances generating strong magnetic fields,
  - places subject to vibrations, and
  - poorly ventilated places.
- Be careful of moisture condensation.
  Avoid using the HR-7610MSB immediately after moving from a cold place to a warm place or soon after heating a room which was cold. The water vapor in warm air will condense on the still-cold video head drum and tape guides and may cause damage to the tape and the recorder.
- Handle the HR-7610MSB carefully.
  - Do not block the ventilation openings.
  - Do not place anything heavy on the recorder.
  - Do not place anything which might spill and cause trouble on the top cover of the recorder.
  - Use in horizontal (flat) position only.
- In case of transportation,
  - Avoid violent shocks to the recorder during packing and transportation.
  - Before packing, be sure to remove the cassette from the recorder.



Video cassettes

- The HR-7610MSB employs VHS-type cassettes only.
  E-240 for 4 hours, E-180 for 3 hours, E-120 for 2 hours, E-60 for 1 hour and E-30 for 30 minutes of PAL or SECAM recording. T-160 for 2 hours and 40 minutes, T-120 for 2 hours, T-60 for 1 hour and T-30 for 30 minutes of NTSC recording.
- Video cassettes are equipped with a safety tab to prevent accidental erasure. When the tab is removed, recording cannot be performed. If you wish to record on a cassette whose tab has already been removed, use adhesive tape to block the hole.
- Avoid exposing the cassettes to direct sunlight. Keep them away from heaters.
- Avoid extreme humidity, violent vibrations or shocks, strong magnetic fields (near a motor, transformer or magnet) and dusty places.
- Place the cassettes in cassette cases and position vertically.

Moisture condensation

- If you pour a cold liquid into a glass, water vapor in the air will condense on the surface of the glass. This is called moisture condensation.
- Moisture condensation on the head drum, one of the most crucial parts of the HR-7610MSB, will cause damage to the tape.
- Moisture in the air will condense on the HR-7610MSB when you move the unit from a cold place to a warm place, after heating a cold room or under extremely humid conditions.
- The HR-7610MSB is equipped with a moisture condensation prevention circuit which automatically heats the head drum according to the ambient temperature. This circuit operates only when the unit is plugged into an AC outlet, the rear panel SECTEUR (mains power) switch is set to MARCHE (on) and the front panel sub-power switch is set to ARRET (off).
- The moisture condensation prevention circuit consumes only a slight amount of power. However, if for some reason you are not using the HR-7610MSB for a long period of time, it is advisable to remove the power cord from the AC outlet or set the rear panel SECTEUR switch to ARRET.
- Since the moisture condensation prevention circuit cannot evaporate existing moisture condensation immediately after the power cord has been plugged into the AC outlet, you must allow for about 2 hours if the HR-7610MSB is to be used in such areas as would occasion moisture condensation.

Operation

- The cassette can be loaded only when the recorder is powered (with the front panel sub-power switch set to MARCHE). Do not force the cassette into the slot with the power off.
- When the rear panel SECTEUR switch is set to MARCHE after it has been set to ARRET once, the recorder section cannot be powered even though the front panel sub-power switch has been in the MARCHE position. In such a case, first set the sub-power switch to ARRET and then set it to MARCHE.
- If you wish to operate the recorder locally after you have switched the power off via the remote control unit, first set the sub-power switch to ARRET and then set it to MARCHE again.
- As long as the sub-power switch is set to MARCHE, switching the recorder on or off can be performed via the remote control unit.

Remote control unit

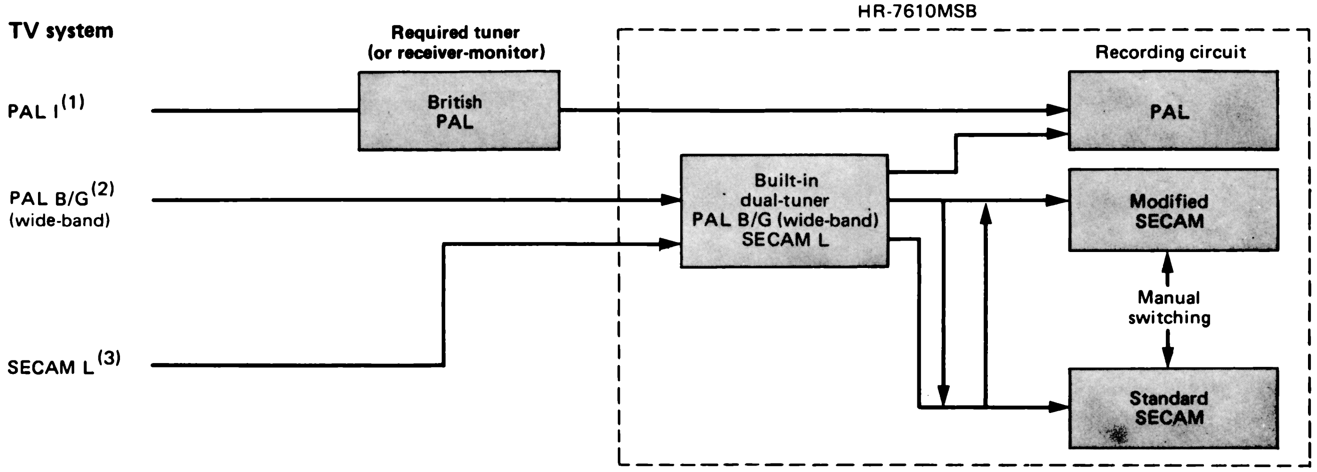
- Avoid violent shocks, especially take care not to drop the unit.
- Take care not to allow liquid to spill into the unit.
- Do not place heavy objects on the unit, especially be careful not to step on it.
- Avoid leaving the unit in places subject to direct sunlight or extremely high temperatures.

IMPORTANT INFORMATION ON COLOUR SYSTEM SELECTION

The HR-7610MSB incorporates the circuitry necessary to record or play back the PAL, SECAM or NTSC (4.43 MHz) signals. To select the right colour system, there are three switches on the HR-7610MSB; SELECT. SYSTEME switch (58) having the AUTO and MANU positions, SELECT. SYSTEME switch (52) having the PAL, SECAM and NTSC positions, and SELECT. SYSTEME switch (51) having the STD and MODF positions.

Generally, the master switch (58) is set to AUTO, the appropriate system is selected according to the input signal or playback signal. However, some situations require manual switching. The circuit in operation is indicated by the four SYSTEME COULEUR (color system) indicators (57). Please read carefully the following information to ensure correct recording and playback.

Off-air recording



Off-air recording

As illustrated above, the HR-7610MSB can directly record three different types of TV broadcasts due to the built-in dual-tuner.

(1) PAL I broadcasts

PAL I is the colour television broadcasting system frequently identified as the British PAL system and used in England and Ireland. In areas where TV broadcasts of these countries can be received, it is possible to record them by using a separate tuner (or receiver-monitor) built to the British PAL system. The setting of the SELECT. SYSTEME switches is identical to that for PAL B/G described below.

(2) PAL B/G broadcasts

PAL B/G is the colour television broadcasting system used in most Continental European countries (except France, Luxemburg and Monaco). The built-in wide-band tuner can be used to record TV broadcasts of these countries. Simply set the master SELECT. SYSTEME switch to AUTO. Or set it to MANU and set the PAL/SECAM/NTSC switch to PAL. Use the tuner channels 5 through 12.

(3) SECAM L broadcasts

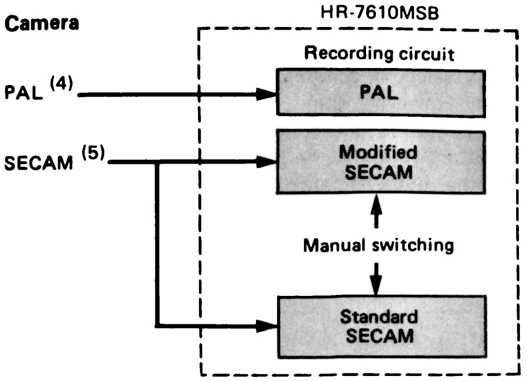
SECAM L is the colour television broadcasting system usually identified as the French SECAM system and is employed in France and a few other countries. TV broadcasts of these countries can be recorded with the built-in tuner using the tuner channels 1 through 4. The STD/MODF switch must be set manually depending on which type of tape is to be made, even when the master SELECT. SYSTEME switch is set to AUTO.

CAUTION

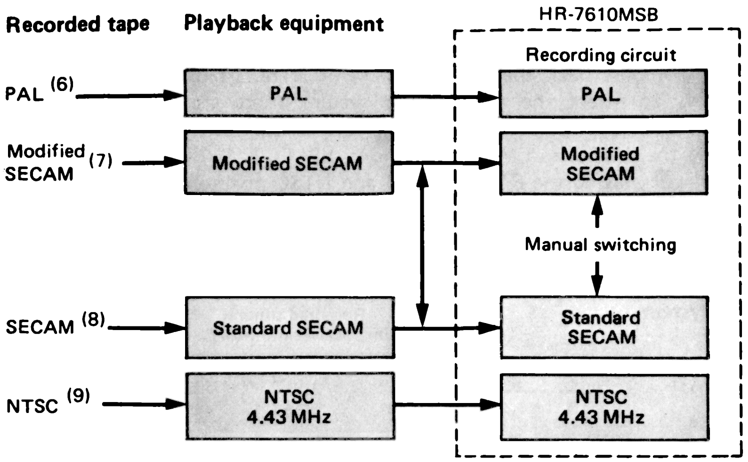
SECAM channels A, B, C1 and C cannot be recorded with this recorder.

For further information, consult your nearest JVC dealer.

Camera recording


Camera
HR-7610MSB
Recording circuit
PAL (4)
PAL
SECAM (5)
Modified SECAM
Manual switching
Standard SECAM

Tape-to-tape transfer


Recorded tape
Playback equipment
HR-7610MSB
Recording circuit
PAL (6)
PAL
PAL
Modified SECAM (7)
Modified SECAM
Modified SECAM
Manual switching
SECAM (8)
Standard SECAM
Standard SECAM
NTSC (9)
NTSC 4.43 MHz
NTSC 4.43 MHz

Camera recording

Both PAL and SECAM video cameras can be used with this recorder. To produce tapes with normally recorded signals, use the AUTO mode or set the SELECT. SYSTEME switches correctly. For instance, it is impossible to produce SECAM tapes with a PAL camera by manually selecting the SECAM circuit.

(4) PAL cameras

Setting the master SELECT. SYSTEME switch to AUTO is sufficient in most cases.

(5) SECAM cameras

Either standard or modified SECAM tapes can be produced, depending on the STD/MODF switch position.

Tape-to-tape transfer

There are 4 different types of recorded tape, depending on the signal recorded.

(6) PAL tapes

To transfer PAL tapes, a second recorder built to the PAL standard is required to play them. Switch positions are identical to those for recording PAL broadcasts and from a PAL camera.

(7) Modified SECAM tapes

Use playback equipment which is capable of processing modified SECAM signals. Depending on what type of tape is desired, either the modified SECAM or standard SECAM circuit of the HR-7610MSB can be used. Set the STD/MODF switch manually as required.

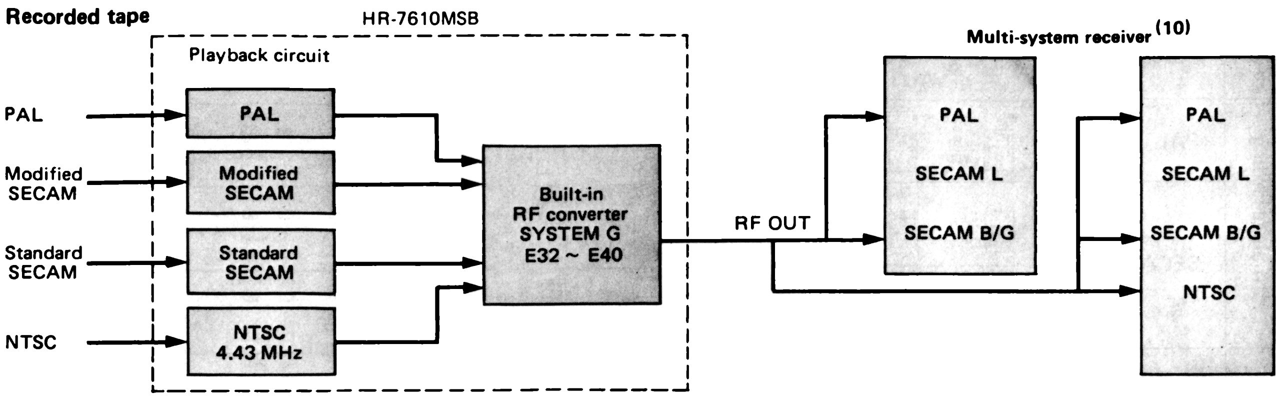
(8) Standard SECAM tapes

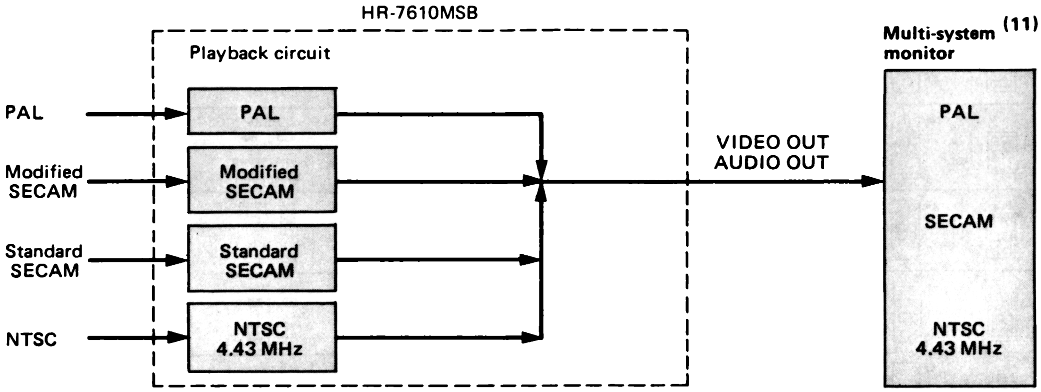
Use playback equipment which is capable of handling standard SECAM signals. Depending on what type of tape is desired, either the modified SECAM or standard SECAM circuit of the HR-7610MSB can be used. Set the STD/MODF switch manually as required.

(9) NTSC tapes

NTSC is the colour television broadcasting system used in the USA, Canada, Japan, several Latin American countries and a few Asian countries. Tapes recorded off the air in these countries or with an NTSC camera using an NTSC recorder can be copied. To do this, the playback equipment must be built to the NTSC 4.43 MHz standard. Set the master SELECT. SYSTEME switch to AUTO, or set this switch to MANU and the PAL/SECAM/NTSC switch to NTSC. The STD/MODF switch has no effect, although the MODIFIE indicator lights when the NTSC circuit is selected.

Playback


Recorded tape
HR-7610MSB
Playback circuit
PAL
Modified SECAM
Standard SECAM
NTSC
PAL
Modified SECAM
Standard SECAM
NTSC 4.43 MHz
Built-in RF converter SYSTEM G E32 ~ E40
RF OUT
Multi-system receiver (10)
PAL
SECAM L
SECAM B/G
PAL
SECAM L
SECAM B/G
NTSC


HR-7610MSB
Playback circuit
PAL
Modified SECAM
Standard SECAM
NTSC
PAL
Modified SECAM
Standard SECAM
NTSC 4.43 MHz
VIDEO OUT
AUDIO OUT
Multi-system monitor (11)
PAL
SECAM
NTSC 4.43 MHz

Playback

As mentioned above, there are 4 different types of recorded tape. To view video tapes, you can use a TV receiver, a video monitor, or a receiver-monitor. It is assumed that the purchaser of the HR-7610MSB owns a multi-system television set, one of those suggested in the chart.

(10) Multi-system receiver

Since the built-in RF converter is built to the G system, all tapes can be seen by setting the television's system select switch to G/B and tuning to the RF converter's output channel (E32 – E40 adjustable). If your television set has also an NTSC signal processing circuit, NTSC tapes, too, can be seen through the built-in RF converter.

(11) Multi-system monitor

All tapes can be seen with a triple-system monitor having PAL, SECAM and NTSC 4.43 MHz circuits.

CAUTION

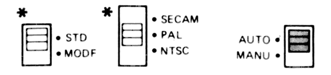
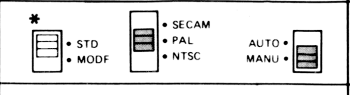
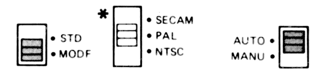
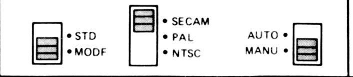
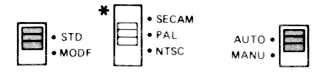
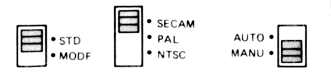
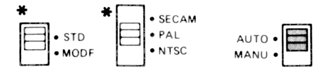
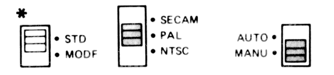
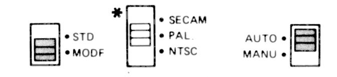
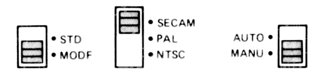
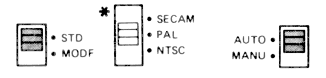
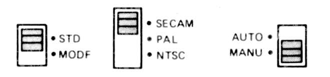
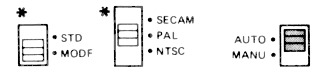
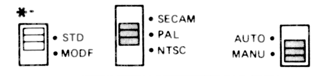
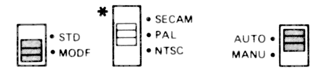
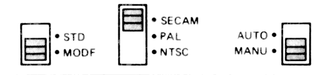
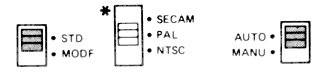
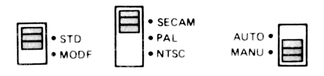
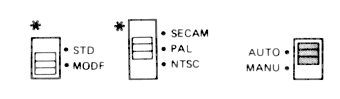
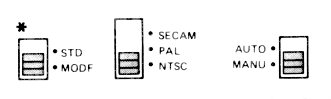
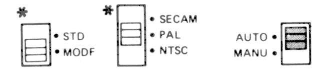
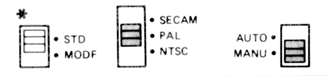
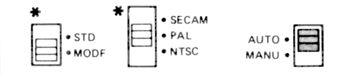
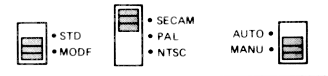
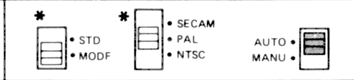
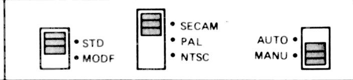
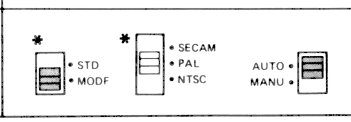
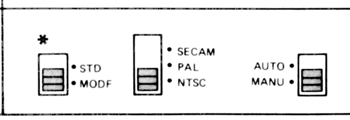
When the HR-7610MSB is connected to a multi-system television set, set the television's system select switch to the B/G position. If it is provided with the AUTO position, this also can be applied. However, it may happen that no colour appears on the screen.

SELECT. SYSTEME switches and indicators

(Refer to the chart on the next page.)

- When the master SELECT. SYSTEME switch is set to AUTO, the HR-7610MSB reads the input signal (or taped signal during playback) and automatically activates the necessary circuit. For modified SECAM or standard SECAM only, set the STD/MODF switch as required for recording.
- In the AUTO mode, the indicator corresponding to the automatically selected system lights.
- When the master SELECT. SYSTEM switch is set to MANU, the selected circuit is activated regardless of the input signal. The indicator shows the switch positions.
- While recording in the AUTO mode, if the input signal is unstable, substandard or interrupted, the lighted indicator starts flashing.
- If there is no input signal at the initial stage of recording in the AUTO mode, the MANU mode is forcedly engaged and the system corresponding to the switch positions is activated, causing the corresponding indicator to flash.
- Tapes recorded in the LP (Long Play) or EP (Extended Play) mode cannot be played back on this unit. If playback is attempted with such a tape in the AUTO mode, the relevant indicator will flash.
- In the MANU mode, no indicator flashes in any situation. Playback picture is the reference.
- With a B/W signal input, or when a B/W tape is played back in the AUTO mode, the PAL indicator will light with CCIR signals and the NTSC and MODIFIE indicators will light with EIA signals.

SELECT. SYSTEME switch positions & Indicators

Use	Source	SELECT. SYSTEME switches		Indicators	Remarks
		AUTO mode	MANUAL mode		
Off-air recording	PAL			PAL ■ SECAM □ NTSC □ MODIFIE □	
	SECAM			PAL □ SECAM ■ NTSC □ MODIFIE ■	To produce modified SECAM tapes.
				PAL □ SECAM ■ NTSC □ MODIFIE □	To produce standard SECAM tapes.
Camera recording	PAL			PAL ■ SECAM □ NTSC □ MODIFIE □	
	SECAM			PAL □ SECAM ■ NTSC □ MODIFIE ■	To produce modified SECAM tapes.
				PAL □ SECAM ■ NTSC □ MODIFIE □	To produce standard SECAM tapes.
Tape-to-Tape transfer	PAL			PAL ■ SECAM □ NTSC □ MODIFIE □	
	SECAM			PAL □ SECAM ■ NTSC □ MODIFIE ■	To produce modified SECAM tapes.
				PAL □ SECAM ■ NTSC □ MODIFIE □	To produce standard SECAM tapes.
	NTSC (played on NTSC 4.43 MHz machine)			PAL □ SECAM □ NTSC ■ MODIFIE ■	
Playback	PAL			PAL ■ SECAM □ NTSC □ MODIFIE □	
	Modified SECAM			PAL □ SECAM ■ NTSC □ MODIFIE ■	
	Standard SECAM			PAL □ SECAM ■ NTSC □ MODIFIE □	
	NTSC			PAL □ SECAM □ NTSC ■ MODIFIE ■	

*The position of a switch so marked is irrelevant.

GENERAL DESCRIPTION OF CONTROLS, INDICATORS AND CONNECTORS

Front panel

① **Sub-power switch**
Set-to MARCHE when you use the recorder for recording or playback. Set to ENR. PROG. after you have preset the recorder for unattended timer recording, and the power will switch on automatically when the preset time is reached. Set to ARRET when you switch off the power from the recorder section. When the switch is set to MARCHE (with the SELECT. ENR. switch [illegible] set to TUNER), the recorder's built-in tuner operates to receive off-the-air TV programmes.

② **Tape run indicator (DEFILEMENT)**
The LED blinks according to the supply reel speed, in synchronism with the tape counter, showing the condition of tape running.

③ **Dolby* NR indicator**
This LED lights when the NR switch ㊾ is set to MARCHE.

④ **Tape end indicator (FIN DE BANDE)**
This LED lights when the tape reaches its last portion of about 10 minutes in the Record or Play mode, and then starts flashing about 5 minutes before the end of the tape.

⑤ **Cassette loading slot**
When the sub-power switch ① is set to MARCHE, the cassette loading mechanism becomes operative. Insert a video cassette with its labelled edge facing toward you. The cassette carriage itself will automatically take control and retract the cassette into the correctly loaded position.

⑥ **EJECT button**
Press to eject the cassette.

⑦ **X2 button**
Press for double-speed playback after engaging the Play mode.

⑧ **Slow-motion button (RALENTI)**
Press for slow-motion playback after engaging the Play mode. To vary the slow-motion speed, turn the RALENTI control knob [illegible].

⑨ **Audio dub button (DOUBLAGE SON)**
Press together with the LECTURE button ⑭ to record audio on a pre-recorded tape.

⑩ **Record button (ENR.)**
Press together with the LECTURE button ⑭ for video and audio recording.

⑪ **Stop button (ARRET)**
To stop the tape.

⑫ **Rewind/Shuttle search button (RETOUR RAPIDE/RECHERCHE)**
To rewind the tape. This button can be pressed directly from any mode except the Record and Audio Dub modes. During playback, this button enables high-speed playback at about 9 times normal speed with PAL/SECAM tapes (about 7 times with NTSC tapes) in the reverse direction only while it is being pressed, facilitating fast and accurate location of a particular tape section.

⑬ **Pause/Still button (PAUSE/ARRET)**
To stop the tape temporarily. During recording, press this button to avoid recording unwanted material. During playback, press this button to view a still picture.

⑭ **Play button (LECTURE)**
To play back the tape. Also press this button together with the ENR. button ⑩ for recording or with the DOUBLAGE SON button ⑨ for audio dubbing.

⑮ **Frame advance button (AVANCE IMAGE)**
To view the playback picture frame by frame. When the button is pressed once after the Still mode has been engaged, the picture is advanced by one frame.

⑯ **Fast Forward/Shuttle search button (AVANCE RAPIDE/RECHERCHE)**
To fast forward the tape. This button can be pressed directly from any mode except the Record and Audio Dub modes. During playback, this button enables high-speed playback at about 9 times normal speed with PAL/SECAM tapes (about 7 times with NTSC tapes) in the forward direction only while it is being pressed, facilitating fast and accurate location of a particular tape section.

⑰ **Clock set button (MISE A L'HEURE)**
Press this button when you adjust the clock for the correct time and the day of the week. For details, see page 17.

⑱ **Programme set button (FIX. PROG.)**
Press this button when you want to pre-programme the timer by entering such data as the day of the week, switch-on time, recording legnth and the channel number of the TV programme from which you want to record.

⑲ **Clock button (HORLOGE)**
Press this button when you want to change the dispaly mode to the Clock mode from the Programme or Clock Set mode.

⑳ **Dimmer button (VEILLEUSE)**
The brightness of the display can be subdued by pressing this button.

㉑ **Programme repeat button (REPET. PROG.)**
After you have entered all programming data for unattended recording, if you wish the entered data to be kept for repeated recording, press this button. The programme repeat indicator ㉕ will be illuminated.

㉒ **Programme No. button (PROG. N^O)**
Press this button in the Programme Set mode to call up a programme number to which the recording data are to be entered. The number of the called-up programme will be displayed on the PROGRAMME N^{O} indicator ㉔.

㉓ **Cancel button (ANNUL.)**
Press this button to cancel or "clear" the preset data after calling up the corresponding programme number on the PROGRAMME N^{O} indicator ㉔.

㉔ **Programme No. indicator (PROGRAMME N^{O})**
Numerals 1 through 8 are successively displayed to show which programme is ready for entry. Programmes can be called up by pressing the PROG. N^{O} button ㉒ in the Programme Set mode either for entry or for checking.

㉕ **Programme repeat indicator**
When a certain scheduled programme is to be recorded repeatedly week after week or every day indefinitely, the REPET. PROG. button ㉑ is to be pressed. Then this indicator lights to indicate that the command for "repeat" has been memorized.

㉖ **Week indicator**
The indication "1ere" or "2eme" will be illuminated for setting the day for making timer recordings; "1ere" stands for the period within one week and "2eme" within the second week from setting.

㉗ **Day indicator**
Both for constant day indication and day presetting for future recordings.

㉘ **Hour digits**

㉙ **Minute digits**

㉚ **Counter/Recording Length (min) digits [COMPTEUR/DUREE ENR. (MIN)]**
These smaller 4 figures offer three different functions depending on the selected mode.
In the Clock Set mode (with the MISE A L'HEURE button pressed) a two-digit figure is displayed for counting the seconds.
In the Programme Set mode (with the FIX. PROG. button pressed) or the Sleep Timer mode (see the FIN. EN indicator ㉛) three digits are displayed and a recording length (or a period of time after which power will be switched off automatically) can be set in minutes (settings in 5-minute increments up to 395).
Except for these three modes, this section functions as a 4-digit tape counter.

㉛ **Sleep indicator (FIN. EN)**
When you wish recording to stop after a certain period of time, set the sub-power switch to ENR. PROG. after you have started recording. This is referred to as the Sleep Timer mode and the word "FIN. EN" will be illuminated. The period of time after which you want recording to stop can be set on the three-digit display, which shows first "060", by pressing the SELECT. and FIX. buttons. (See page 26.)

㉜ **Select button (SELECT.)**
Press this button to call up the specific item for setting. When the FIX. PROG. button ⑮ is pressed, the item for setting changes each time this button is pressed in the order of "channel", "day", "hour", "minute" and "recording length", and the corresponding portion of the display flashes.
When the MISE A L'HEURE button ⑰ is pressed, the item for setting changes each time this button is pressed in the order of "second", "minute", "hour" and "day", and the corresponding portion of the display flashes.
In the Sleep Timer mode, when the SELECT. button is pressed, the recording length digits start flashing to show that the setting is ready to be made.

㉝ **Set button (FIX.)**
After selecting the item for setting with the SELECT. button ㉜ , press this button until the desired indication is reached. Holding it pressed continuously advances the indication rapidly. However, when you select the "second" setting with the SELECT. button ㉜ , the second indication is held at "00" when the FIX. button is held pressed. This is to set the clock time precisely to the second. (See page 17.)

㉞ **Built-in tuner pre-tuning compartment cover**

㉟ **Automatic fine-tuning switch (REGL. FIN AUTO)**
Set to MARCHE to activate the built-in Automatic Fine-Tuning circuit for fine picture tuning.

㊱ **Channel preset switch (PREREGL. DES CANAUX)**
Set to M. when you pre-tune the built-in tuner to TV stations in your area. (See pages 15 and 16.)

㊲ **Preset indicator**
This LED lights when the PREREGL. DES CANAUX switch ㊱ is set to M. or SAUT and blinks to show that the pre-tuned station has been memorized by pressing the tuning control (labelled STOCKAGE).

㊳ **Band select switch**
This lever-type switch has three positions; U, III and I as illustrated nearby.
Select the frequency band which contains a station you are going to pre-tune to. For more details, refer to page 16.

㊴ **Tuning control (STOCKAGE)**
Turn in either direction to tune in to each of up to 12 different television stations in your area. After you have pulled in the station, simply press this same control. Then the indicator ㊲ will start blinking. Blinking will stop in a few seconds. This means that the station was stored in memory.

㊵ **Tuning indicator**
The index line moves as the tuning control is tuned so as to provide a rough reference concerning the frequency in each selected band.

㊶ **Sub-power indicator**
When the sub-power switch is set to MARCHE, or when the preset switch-on time is reached with the sub-power switch set to ENR. PROG., this indicator lights.

㊷ **Mains power indicator**
This green LED remains lighted as long as the rear panel SECTEUR switch is set to MARCHE.

㊸ **VIDEO indicator**
Indicates that the recorded programme being played back or an off-the-air programme being received by the HR-7610MSB's built-in tuner can be viewed on the connected TV set.

㊹ **VIDEO/TV switch**
Selects between TV and VIDEO modes.
TV mode (the indicator is off): for TV viewing and for watching a TV programme while recording another.
VIDEO mode (the indicator lights): for recording a TV programme while watching it and for playing back recorded tapes. If the VIDEO indicator ㊸ lights when the sub-power switch ① is set to MARCHE, the recorder is in the VIDEO mode. If you want to engage the TV mode, press down the VIDEO/TV switch so that the indicator extinguishes. If the indicator does not light when the sub-power switch is set to MARCHE, the recorder is in the TV mode. If you want to engage the VIDEO mode, press down the VIDEO/TV switch so that the indicator lights.

㊺ **Microphone jack (MICRO)**
Connect a microphone for audio dubbing or mixed recording.

㊻ **Slow-motion speed control (RALENTI)**
During slow-motion playback, turn this knob to obtain your desired speed; toward + for faster and – for slower speeds.

㊼ **Insert indicator (INSERT.)**
This LED lights when the Insert Edit mode is engaged. (See (53).)

㊽ **Tracking controls (ALIGNEMENT)**
Turn the ALIGNEMENT controls to minimize noise bars, if observed during playback. Use the 2X/STD control during playback at normal and double-speed, and the RALENTI control during slow-motion playback.

㊾ **Dolby* NR switch**
Set to MARCHE to activate the built-in Dolby noise reduction system to eliminate tape hiss noise. Recordings made with the NR switch set to MARCHE should be played back with the NR switch set to MARCHE. The sound quality is not improved if non-Dolbyized recordings are played back with the NR switch set to MARCHE, but the tone differs from the original.

㊿ **Search switch (RECHERCHE)**
Two search modes are available; counter search (COMPTEUR) and cue search (REPERE).
When the switch is set to COMPTEUR, the tape stops automatically at the counter reading of nearly "0000" during fast forward and rewind. When the switch is set to REPERE, the tape stops automatically at a point where a new recording was made, during either rewind or fast forward by sensing the cue signal. Refer to page 31. Normally set this switch to ARRET.

(51) **System select (STD/MODF) switch (SELECT. SYSTEME)**
Set this switch to either STD or MODF when recording SECAM signals, depending on the type of tape desired.
For more details refer to "Important information on colour system selection" on pages 4 through 7.

(52) **System select (SECAM/PAL/NTSC) switch (SELECT. SYSTEME)**
Use this switch to manually select the appropriate system only when the master SELECT. SYSTEME switch (58) is set to MANU. For more details refer to "Important information on colour system selection" on pages 4 through 7.

(53) **Insert button (INSERT.)**
Press this button for insert editing. See page 29.

(54) **V-Hold control (STABILITE VERT.)**
For adjusting the picture during slow-motion, still-frame and double-speed playback, if the TV receiver's V-Hold control fails to correct a phenomenon caused by insufficient vertical lock.

(55) **Counter reset button (COMPTEUR ZERO)**
Press this button to reset the counter to "0000".

(56) **Infrared beam receiving window**
For receiving signals from the infrared remote control unit.

(57) **Colour system indicators (SYSTEME COULEUR)**
These four indicators show the selected system, according to the detected input signal (in the AUTO mode), or to the switch positions (in the MANU mode). For more details refer to "Important information on colour system selection" on pages 4 through 7.

(58) **System select (AUTO/MANU) switch (SELECT. SYSTEME)**
This is a master switch for selecting the television system. First set this switch to either AUTO or MANU depending on the required mode. When the MANU mode is selected, set the other two SELECT. SYSTEME switches manually as required. For more details refer to "Important information on colour system selection" on pages 4 through 7.

(59) **Recording select switch (SELECT. ENR.)**
For selecting the recording input signal.
Set to TUNER when recording signals coming from the built-in tuner (TV programmes).
Set to AUX when recording signals coming from the units connected to the rear panel ENTREE VIDEO and AUDIO connectors.
Set to CAMERA when recording signals coming from a camera connected to the front panel CAMERA connector (60)

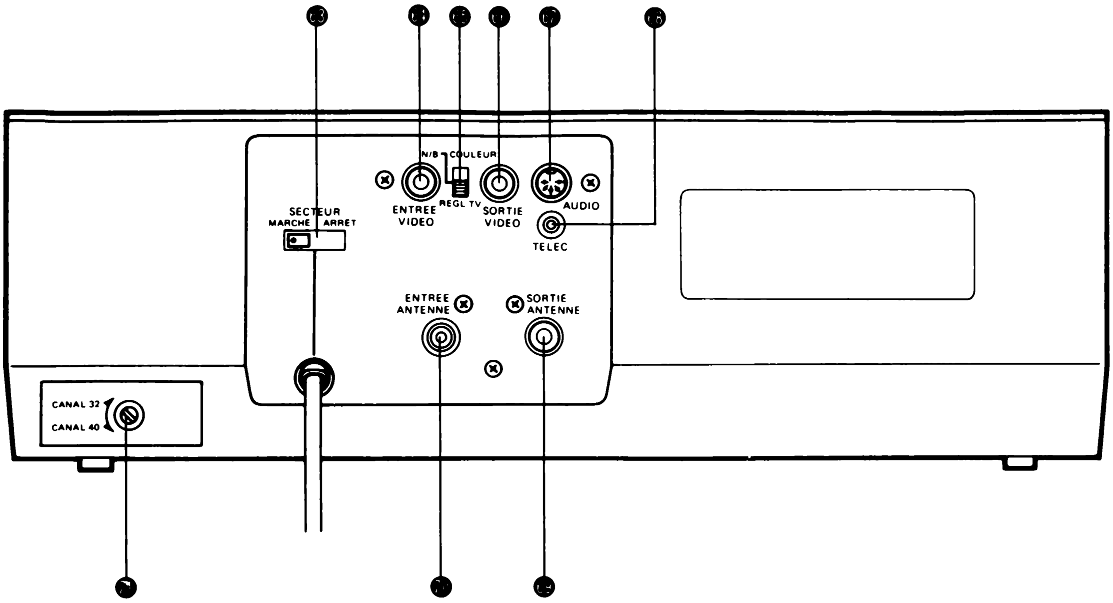
(60) **CAMERA connector**
Connect a JVC video camera directly to this connector using a 10-pin camera cable.
Caution: Other brands of cameras and some JVC cameras may not be electronically compatible, even though the same type of connector is used. Consult your dealer.

(61) **Channel indicators**
The numeral corresponding to the selected channel is illuminated.

(62) **Channel select buttons**
Press to select the specific channel from which you want to record. SECAM for channels 1 to 4 and PAL for channels 5 to 12.

*Noise reduction system manufactured under license from Dolby Laboratories Licensing Corporation.
Dolby and the double-D symbol are trademarks of Dolby Laboratories Licensing Corporation.

Rear Panel



● **Mains power switch (SECTEUR)**
Switching on applies mains power to the set. To switch off the set completely, set this switch to ARRET. This switches off the timer/clock circuit and cancels all the preset programming data after the memory backup time (about 10 minutes) has elapsed. This also switches off the built-in aerial circuit so that the TV receiver connected to the HR-7610MSB will not be able to receive off-the-air TV programmes for good viewing condition. Normally set this switch to MARCHE.

● **Video input connector (ENTREE VIDEO)**
Connect the video output of other video equipment such as another video tape recorder.

● **Video mode select switch**
This applies to both recording and playback.

COULEUR:	Set to this position when the input or playback video signal is in colour.
N/B:	Set to this position when the input or playback video signal is monochrome.
REGL. TV:	Set to this position when tuning your TV receiver for the "Video Channel".

● **Video output connector (SORTIE VIDEO)**
Video signals being recorded or played back are available from this connector.

● **AUDIO input/output DIN socket**
Connect a tape recorder or other audio sources or connect the audio output of other video sources for recording. Also, audio signals being recorded or played back are available from the output terminals of this DIN socket.

● **Remote control connector (TELEC.)**
The RM-P73U wired remote control unit, optionally available, can be connected to this terminal.

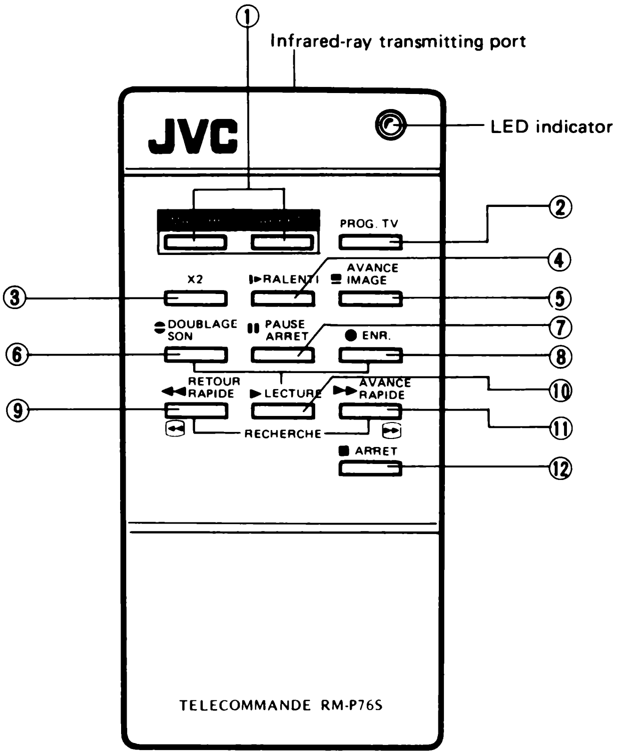
● **RF output connector (SORTIE ANTENNE)**
Connect to the antenna connector of a TV receiver through the aerial cable (provided).

● **Antenna input connector (ENTREE ANTENNE)**
Connect an aerial to this connector.

● **RF converter frequency adjustment screw**
To re-adjust the output frequency of the built-in RF converter. (See page 14.)

Infrared remote control unit

The infrared remote control unit provided, lets you control 16 functions from your viewing position.


①
Infrared-ray transmitting port
JVC
LED indicator
②
PROG. TV
④
X2
RALENTI
AVANCE IMAGE
③
⑤
DOUBLAGE SON
PAUSE ARRET
ENR.
⑦
⑥
⑧
RETOUR RAPIDE
LECTURE
AVANCE RAPIDE
⑩
⑨
RECHERCHE
⑪
ARRET
⑫
TELECOMMANDE RM-P76S

① **MARCHE/ARRET buttons**
To switch power on or off for the recorder.
Notes
- These buttons are not to switch the power circuit of the remote control unit itself on or off. The remote control unit is always ready to operate. It consumes power only at the time the buttons are being pressed.
- In order for the remote control unit to be able to switch the power for the recorder on or off, the recorder's sub-power switch should be in the MARCHE position.

② **TV. programme button (PROG. TV)**
Press this button a number of times until the desired channel number is illuminated on the recorder's channel indicator.

③ **X2 button**
To play back the tape at a speed twice the normal. Before pressing this button, press the LECTURE button.

④ **Slow-motion button (RALENTI)**
To view slow-motion playback. Before pressing this button, press the LECTURE button.

⑤ **Frame advance button (AVANCE IMAGE)**
To advance the playback picture frame by frame in the Still mode.

⑥ **Audio dub button (DOUBLAGE SON)**
Press together with the LECTURE button ⑩ for audio dubbing.

⑦ **Pause/Still button (PAUSE/ARRET)**
To stop the tape temporarily during recording or playback.

⑧ **Record button (ENR.)**
Press together with the LECTURE button ⑩ for starting recording.

⑨ **Rewind/Shuttle search button (RETOUR RAPIDE/RECHERCHE)**
To rewind the tape or to play back the tape at high speed in the reverse direction.

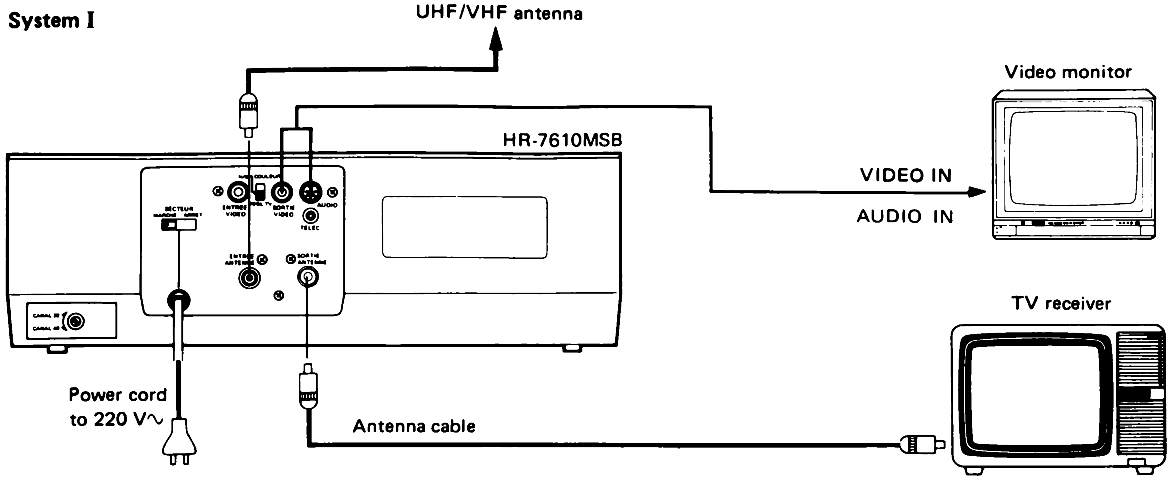
⑩ **Play button (LECTURE)**
To play back the tape.

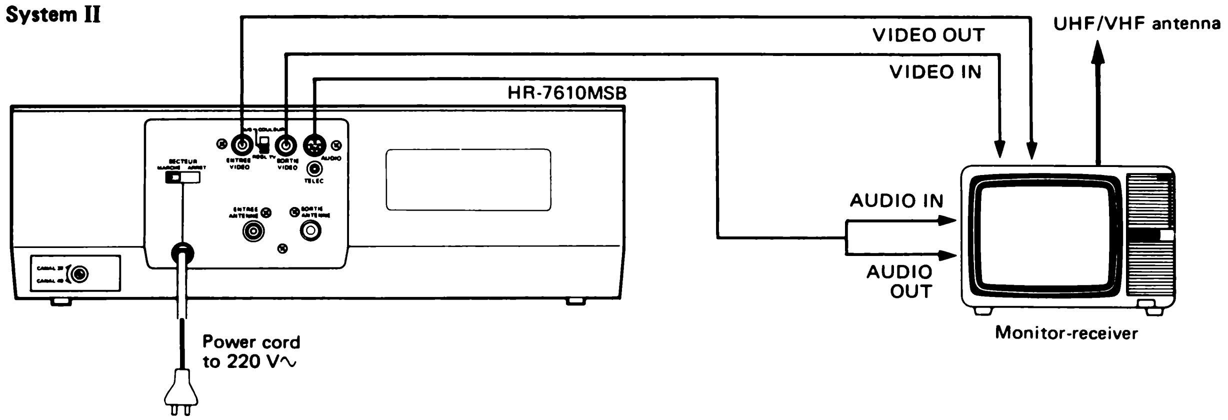
⑪ **Fast forward/Shuttle search button (AVANCE RAPID/RECHERCHE)**
To fast forward the tape or to play back the tape at high speed in the forward direction.

⑫ **Stop button (ARRET)**
To stop the tape.

PART II PREPARATIONS

HOW TO CONNECT THE HR-7610MSB TO YOUR TV SET


System I
UHF/VHF antenna
Video monitor
HR-7610MSB
VIDEO IN
AUDIO IN
TV receiver
Power cord
to 220 V∿
Antenna cable


System II
VIDEO OUT
UHF/VHF antenna
VIDEO IN
HR-7610MSB
AUDIO IN
AUDIO OUT
Monitor-receiver
Power cord
to 220 V∿

System I

Using a TV receiver

1. Remove the antenna cable from your TV receiver and reconnect it to the HR-7610MSB as illustrated. The HR-7610MSB is then ready to record off-air TV programmes.
2. Connect the HR-7610MSB to the TV receiver using the antenna cable provided. The TV receiver is then ready to receive TV broadcast programmes as well as video cassette programmes from the HR-7610MSB.
3. When you use a video monitor for playback, connect the SORTIE VIDEO (video output) and AUDIO connectors of the HR-7610MSB to the video and audio input connectors of the video monitor.

Note

Even when you are not using the HR-7610MSB, the rear panel SECTEUR (mains power) switch should be set to MARCHE (on) in order to be able to view TV broadcast programmes with this connection.

System II

Using a monitor-receiver

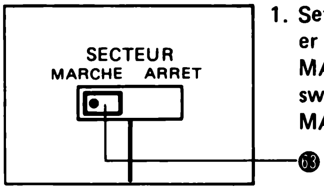
1. Connect the HR-7610MSB to a monitor-receiver as illustrated. This connection enables you to receive TV broadcasts with the tuner in the monitor-receiver, and record them with the HR-7610MSB.

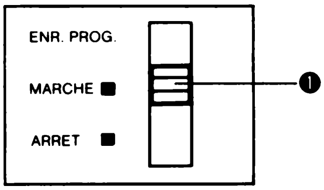
HOW TO SET YOUR VIDEO CHANNEL

The RF converter built into the HR-7610MSB conforms to the G system. When you view video programmes on a TV receiver through this RF converter, follow the instructions below.

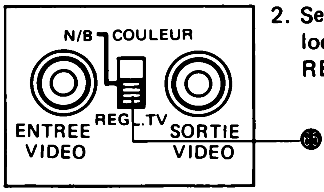
Viewing video cassettes means that the TV receiver receives video playback signals just like it receives broadcast signals. For this purpose, the TV receiver must be set to a specific channel. That channel is "YOUR VIDEO CHANNEL". And it is the built-in RF converter that determines your video channel, since the RF converter permits playback of video and audio recordings through a TV receiver. The signals from the RF converter are viewed through a vacant channel not used for broadcasting. The converter channel of all units is set to UHF channel 36 prior to shipment. Setting your TV receiver to UHF channel 36 may provide video playback. However, to obtain the best possible reproduction on your TV receiver, accurate adjustment to the RF converter output is required.

Procedure

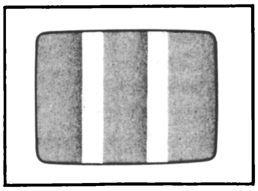




1. Set the rear panel mains power switch (SECTEUR) (63) to MARCHE and set the sub-power switch ❶ on the front panel to MARCHE.

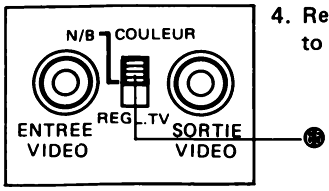


2. Set the video mode switch (65) , located on the rear panel, to REGL. TV (Channel Setting).



3. Adjust your TV receiver in the vicinity of UHF channel 36 until you bring in the two white signal bars on the screen as illustrated.

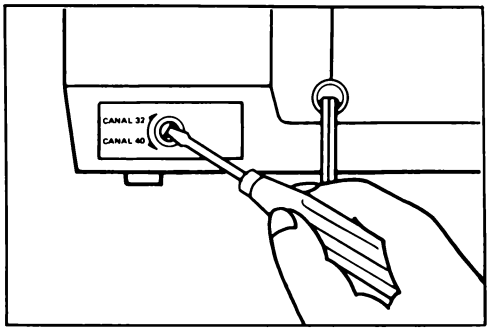
This setting is now the VIDEO CHANNEL of the TV receiver to which the HR-7610MSB is connected.



4. Reset the video mode switch (65) to COULEUR.

Notes

- When you adjust your TV receiver to channel 36 for video playback, if some interference noise is seen on the screen because of broadcasts on neighbouring channels or if your preset UHF broadcasts should be affected in picture quality, it is necessary to shift slightly the RF converter output frequency from that of channel 36.

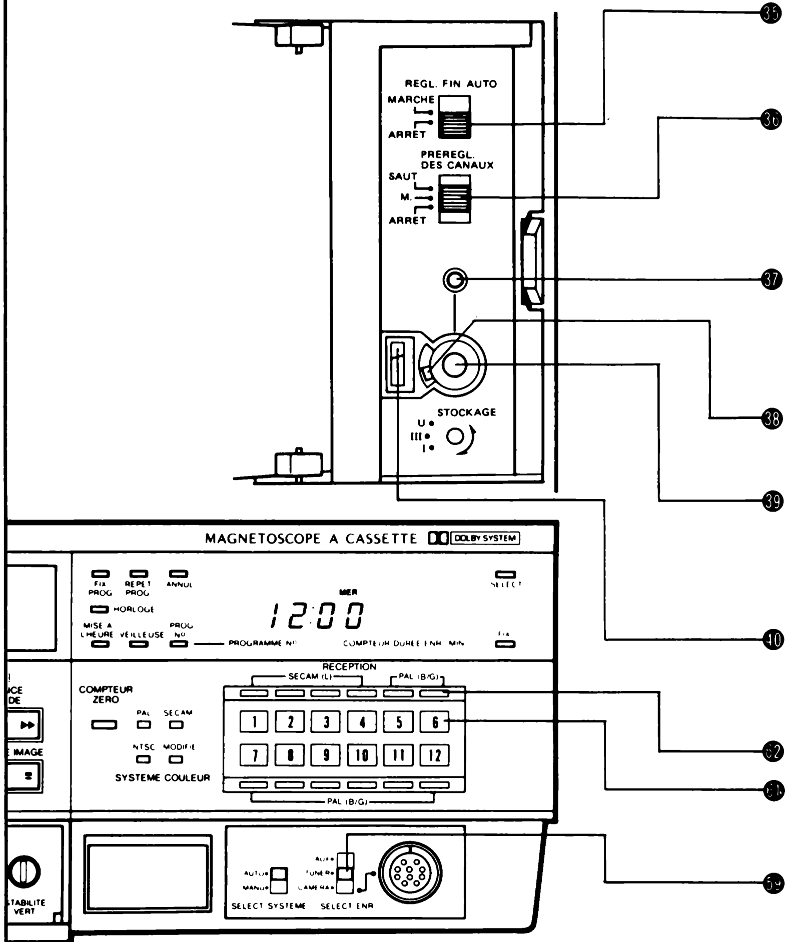


For this purpose, insert a small screwdriver into the RF converter frequency adjustment screw (71) and adjust it in minute steps. Then tune the TV receiver once again until a clear picture is obtained.
This adjustment requires extreme precision and must be done with the utmost care. We recommend that you consult your JVC dealer for making this adjustment.

- Be sure to set the video mode switch to COULEUR after VIDEO CHANNEL tuning has been completed.
- No signal is available from the SORTIE VIDEO terminal while the Channel Setting signal is being used.
- If a prerecorded VHS cassette is available, TV adjustment for VIDEO CHANNEL setting is also possible using it to obtain a playback picture. Insert the cassette and operate the HR-7610MSB for playing back the cassette (See Part III "How to load and unload the video cassette" and "How to playback the video cassette".) Then tune the TV receiver to obtain clear pictures and sound while monitoring the playback picture on the TV screen.
- If your TV receiver is not provided with an AFC circuit, perform fine tuning of the TV receiver when you are actually viewing video cassettes.

HOW TO PRE-TUNE THE BUILT-IN TUNER

Basic guidelines



㉟ **Automatic fine-tuning switch (REGL. FIN AUTO.)**
For automatic fine picture tuning.

㊱ **Channel preset switch (PREREGL. DES CANAUX.)**
Engages or disengages the Channel Preset mode. Also used to preset the channels to be skipped.

㊲ **Indicator**
Lights in the Channel Preset mode and blinks when the tuned-in station is memorized.

㊳ **Band select switch**
To select the TV station frequency band.

㊴ **Tuning control**
Used to tune in to a desired TV station. Pressing this control permits the pre-tuned TV station to be held in memory.

㊵ **Tuning indicator**
Moves to indicate where you are in the selected frequency band.

(62) **Channel select buttons**

(61) **Channel indicators**

(59) **Recording select (SELECT. ENR.)**

The built-in tuner of the HR-7610MSB has a capacity of receiving 12 different channels; 4 SECAM L and 8 PAL B/G stations. It is you who determine what TV station to specify for which channel number.

The basic procedure is: select a channel number, tune in to a station and store the information. Then you can easily call up any preset station simply by pressing the corresponding channel select button.

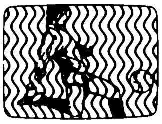
The built-in tuner conforms to the SECAM L and PAL B/G systems. To tune to SECAM broadcasts (French SECAM including Corsica Island), use the first 4 channel select buttons. (However, it is not possible to tune to channels A, B, C1 and C of SECAM L broadcasts.) The rest can be used to tune to Continental PAL broadcasts.

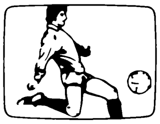
Procedure

1. Set the sub-power switch ① to MARCHE.
2. Switch the power of the TV receiver ON.
3. Set the SELECT. ENR. switch (59) to TUNER.
4. Adjust the TV receiver's channel to your VIDEO CHANNEL. (See page 14.)
   - Now a TV programme, if being received by the built-in tuner, will be shown on the screen of the TV receiver. And now you are ready to preset the built-in tuner to TV stations in your area while monitoring the picture on the TV screen.
5. The VIDEO indicator ⑬ should be lighted. If not, press down the VIDEO/TV switch so that it lights.
6. Open the pre-tuning control compartment cover.
7. Set the PREREGL. DES CANAUX switch ㊱ to M.
   The indicator ㊲ will light. And the AFT (Automatic Fine Tuning) circuit will be switched off automatically regardless of the setting of the REGL. FIN AUTO switch ㉟.
8. Press the channel select button which you have chosen to allocate to the station to be pre-tuned in. The channel number corresponding to the selected channel will be illuminated.

Note
If one of the first four channel select buttons is pressed, the built-in tuner is automatically switched to the SECAM L tuner. No PAL broadcast can be tuned in on these channels.

9. Set the band select switch ㊳ as required.
   Set to I when tuning in to VHF channels E2 – E4, S1 – S3, M1 – M2 in Belgium or E2 – E4, X, Y, Z, S1 – S2 in Switzerland (PAL).
   Set to III when tuning in to VHF channels 1 through 6 (French SECAM) or M3 – M10, E5 – E12, U1 – U10 in Belgium or S3 – S10, E5 – E12, S11 – S20 in Switzerland (PAL).
   Set to U when tuning in to UHF channels 21 through 69.
10. Turn the tuning control ㉞ while observing the TV screen to tune in to a desired station.
    - Turning the tuning control in either direction moves the tuning indicator in the corresponding direction.
11. To obtain the best possible picture, make further adjustments.


Striped picture


Clean picture

- Turn the tuning control first until you get the striped picture and then slowly turn, little by little, to clear up the picture.

12. Push in the same tuning control ㉞ to store the information.
    - The indicator will start blinking. Blinking will stop in a few seconds. This means that the station was stored in memory.
    - If you should happen to turn the tuning control while the indicator is still blinking, the channel lock mechanism will engage and, therefore, if you press another channel select button it will have no effect. To correct this situation in order to proceed with presetting other channels, press the tuning control once again and wait for the blinking of the indicator to stop so that the preset information for the channel you selected last will be stored.
13. Perform the same adjustments, steps 8 through 12, for each of the other channels.
14. If everything is alright, return the PREREGL. DES CANAUX switch ㊱ to ARRET.
15. Make sure that the REGL. FIN AUTO switch ㉟ is set to MARCHE.
16. Close the compartment cover.

Notes
- Normally set the REGL. FIN AUTO switch ㉟ to MARCHE.
  If neighbouring channels are close to each other, set this switch to ARRET.
- If the picture is still not clear, perform fine tuning on your TV receiver.
- Distorted pictures or sound will be recorded if fine tuning has not been properly performed. Exercise care with this adjustment since the recorded picture and sound cannot be adjusted later.

Skipping unused channels

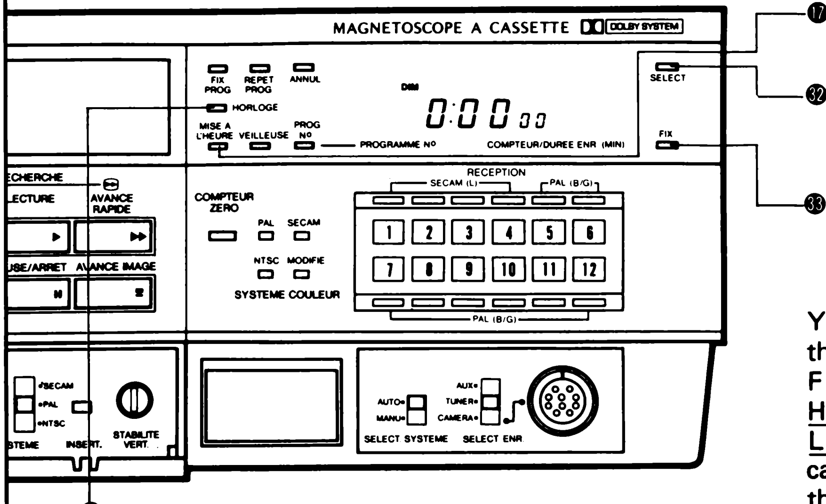
Though 12 channels are available for presetting to desired TV stations, you may not need all 12 channels. In such cases, unused channels can be skipped so that only preset channels are operable. This function is especially convenient when you select the channel via the remote control unit which has only one button for channel selection. If some channels are skipped, you don't have to press the PROG. TV button of the remote control unit a number of times to reach your desired channel.

To skip the channels, proceed as follows:
1. Select the channel you want to skip by pressing the corresponding channel select button ⑫.
2. Set the PREREGL. DES CANAUX switch ㊱ to SAUT.
   - The indicator will light.
3. Push in the tuning control ㉞.
   The indicator will blink momentarily and remain lit after that. This means that the information for skipping that channel has been stored in memory.
4. Select another channel that you wish to skip and repeat the same procedure as above.
5. Return the PREREGL. DES CANAUX switch ㊱ to ARRET.

Notes
- It is possible to restore the skipped channels for presetting to another TV station whenever necessary. For this purpose, set the PREREGL. DES CANAUX switch to MARCHE and press the channel select button corresponding to the channel you want to restore. Then tune in to your desired station and store it in the same manner as described above.
- Channel 1 cannot be skipped.
- When a channel which has been already preset to a station is skipped, the stored information for that channel will be cancelled. Therefore, if you wish to restore the skipped channel, you should perform the channel presetting procedure for that channel once again.

HOW TO SET THE CLOCK

Basic guidelines



MAGNETOSCOPE A CASSETTE
DOLBY SYSTEM
FIX PROG
REPET PROG
ANNUL
HORLOGE
MISE A L'HEURE
VEILLEUSE
PROG NO
DIM
0:00 00
PROGRAMME NO
COMPTEUR/DUREE ENR (MIN)
SELECT
FIX
RECEPTION
SECAM (L)
PAL (B/G)
COMPTEUR ZERO
PAL
SECAM
NTSC
MODIFIE
SYSTEME COULEUR
1
2
3
4
5
6
7
8
9
10
11
12
RECHERCHE
LECTURE
AVANCE RAPIDE
PAUSE/ARRET
AVANCE IMAGE
SECAM
PAL
NTSC
SYSTEME
INSERT.
STABILITE VERT.
AUTO
MANU
AUX
TUNER
CAMERA
SELECT SYSTEME
SELECT ENR

⑰ Clock set button (MISE A L'HEURE)
Engages the Clock Set mode.

㉜ Select button (SELECT.)
Selects the item for setting; "second", "minute', "hour" and "day".

㉝ Set button (FIX.)
Enters the required data for each selected item.

⑲ Clock button (HORLOGE)
Engages the Clock mode.

You need only four controls to set the clock.
First, MISE A L'HEURE and last, HORLOGE. In between only SELECT. and FIX. Select the item (the called-up item will flash to indicate that it is ready to be set) and set it by entering the correct data.

Procedure

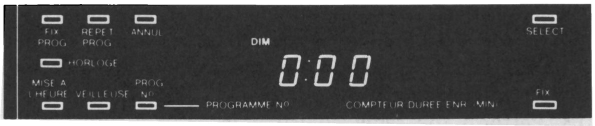
When the HR-7610MSB is plugged into an AC outlet and the rear panel SECTEUR switch is set to MARCHE, the display shows a flashing "DIM 0:00". Now you are ready to set the built-in clock to the correct local time.

1. Press the MISE A L'HEURE button ⑰, and the "second" digits will start counting while flashing.
2. Press the SELECT. button ㉜, and then the "minute" digits will start flashing.
3. Press the FIX. button ㉝ until the correct minute indication is displayed.
4. Press the SELECT. button ㉜, and then the "hour" digits will start flashing.
5. Press the FIX. button ㉝ until the correct hour indication is displayed.
6. Press the SELECT. button ㉜, and then the "DIM" indication will start flashing.
7. Press the FIX. button ㉝ until the correct day is displayed.
8. Press the SELECT. button ㉜, and then the "second" digits will start flashing.
9. Hold the FIX. button ㉝ pressed, and the seconds will be reset to and held at "00".
    - If the "second" indication is over "30" (from 30 to 59), pressing the FIX. button will reset the "second" digits to "00" but will give one increment to the minute indication (for example, 10'35" – 11'00").
10. Release the button at the exact instant of the reference time signal (radio, telephone, TV, etc.) and the clock will be set accurately to the correct local time.
11. Press the HORLOGE button ⑲ to return to the Clock mode. No item will be flashing any more. And the "second" digits will turn off.

Notes

- Holding the FIX. button pressed for more than 1 second continuously advances the minute, hour or day indication automatically. Pressing it once advances the indication in single increments only.
- During the Clock Set mode, if no command is entered within two minutes, the Clock mode will be automatically engaged. If you have not yet made the clock setting, press the MISE A L'HEURE button once again to engage the Clock Set mode.
- Clock setting is impossible with the sub-power switch ❶ set to the ENR. PROG. position.

Power failure indicator



FIX PROG
REPET PROG
ANNUL
SELECT
DIM
HORLOGE
0:00
MISE A L'HEURE
VEILLEUSE
PROG NO
PROGRAMME NO
COMPTEUR DUREE ENR (MIN)
FIX

- If you find "DIM 0:00" flashing on the display, it means that a power failure has occurred and time-keeping has not taken place since that time.
- Correct the time indication following the above procedures.
- If the period of power outage is within about 10 minutes, correct time-keeping continues when power is reapplied.
- During this 10-minute period, the built-in memory back-up capacitor maintains time-keeping and preset timer memory, though the display blacks out.
- The memory back-up capacitor is automatically being recharged as long as the rear panel SECTEUR switch is set to MARCHE. It takes about 30 minutes to recharge this capacitor from its fully discharged condition.

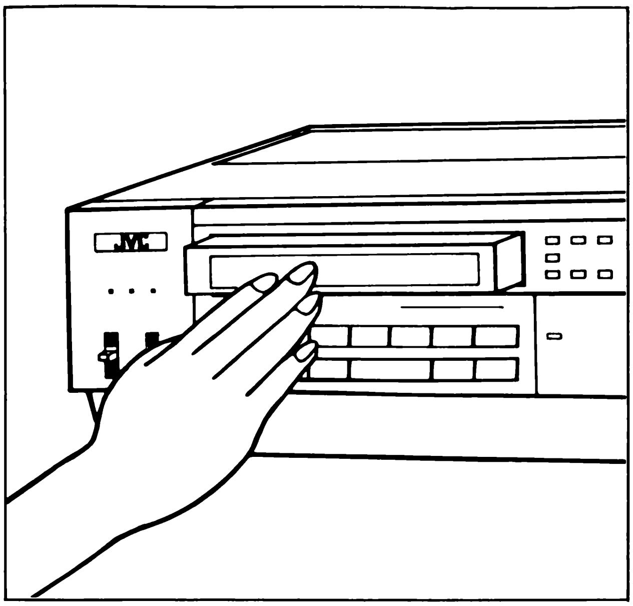
Readjusting the clock time

- If a slight increase or reduction of time indication is found, readjust the clock following the same procedure as for time setting.
- Remember that the seconds from 0 to 29 will be reset to "00" when the FIX. button is pressed and the seconds from 30 to 59 will be reset to "(+1'):00".

PART III BASIC OPERATION

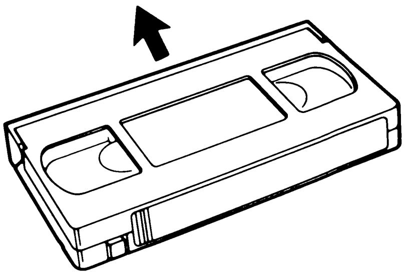
HOW TO LOAD AND UNLOAD THE VIDEO CASSETTE

Caution
- Since the HR-7610MSB employs a motorized cassette loading system, loading and unloading the cassette are only possible when the power is applied to the recorder section. Do not force the cassette into the cassette loading slot while the front panel sub-power switch is set to ARRET.
- Do not attempt to pull out the cassette once automatic loading has started.



Loading

1. Set the sub-power switch ❶ to MARCHE.
2. Insert a cassette with its labelled side facing you. The cassette will automatically be retracted and loaded in the correct position.
   - The stop (ARRET) indicator will be flashing during automatic loading of the cassette and, when it has been correctly loaded, will remain lighted.
   - The automatic loading mechanism will operate only when the cassette is inserted correctly.
   - If loading into the correct position is not executed, the cassette will automatically be ejected after about 6 seconds.



Unloading

1. Press the EJECT button ❻. The cassette will automatically be ejected. Then, simply remove it from the cassette loading slot.
   - The EJECT indicator will be flashing during automatic unloading of the cassette and then turn off upon completion of ejection.
   - The EJECT button can be pressed during any mode except Record and Audio Dub.

HOW TO RECORD A TV PROGRAMME WHILE WATCHING IT

Basic guidelines

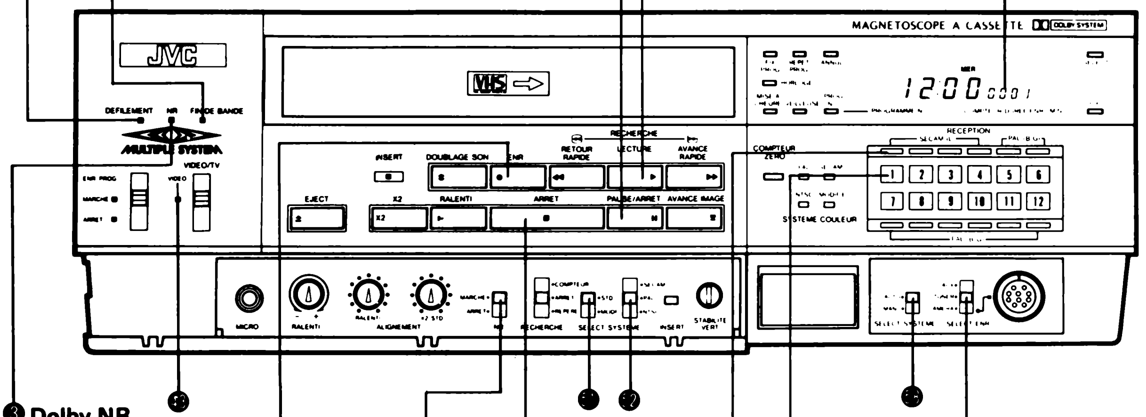
② **Tape run indicator (DEFILEMENT)**
Flashes to show that the tape is running.

④ **Tape end indicator (FIN DE BANDE)**
Lights 10 minutes before the end of the tape and starts flashing 5 minutes before the end of the tape.

● **Pause/Still button (PAUSE/ARRET)**
To stop the tape temporarily.

● **Play button (LECTURE)**
To start tape transport.

● **Tape counter**
When the sub-power switch is set to MARCHE, this 4-digit tape counter is illuminated.


JVC
DEFILEMENT
NR
FIN DE BANDE
MULTI SYSTEM
VIDEO/TV
MAGNETOSCOPE A CASSETTE
DOLBY SYSTEM
VHS
INSERT
DOUBLAGE SON
ENR
RECHERCHE
RETOUR RAPIDE
LECTURE
AVANCE RAPIDE
EJECT
X2
RALENTI
ARRET
PAUSE/ARRET
AVANCE IMAGE
1200
COMPTEUR ZERO
RECEPTION
SYSTEME COULEUR
1 2 3 4 5 6
7 8 9 10 11 12
MICRO
RALENTI
ALIGNEMENT
NR
RECHERCHE
SELECT SYSTEME
INSERT
STABILITE VERT
SELECT SYSTEME
SELECT ENR

③ **Dolby NR indicator**

● **Record button (ENR.)**
To start recording.

● **Stop button (ARRET)**
To stop recording.

● **NR switch**
To improve sound quality.

● **Recording select switch (SELECT. ENR.)**
Setting to TUNER activates the built-in tuner.

● **Channel indicators**
The selected channel will be illuminated.

● **Channel select buttons**
For selecting the specific channel from which you want to record.

Now you are ready to record your favourite TV programmes. Guidelines for doing this: receive the desired TV programme with the built-in tuner and operate the tape section.

Confirm the settings of the SELECT. SYSTEME switches (51), (52) and (56) by referring to the chart on page 7.

Preparation

1. Set the sub-power switch ● to MARCHE.
2. Load a cassette.
3. Set the SELECT. ENR. switch ● to TUNER.
4. The VIDEO indicator ● should be lighted. If not, press down the VIDEO/TV switch so that it lights.
5. Set the channel selector of your TV receiver to your VIDEO CHANNEL. (See page 14.)
6. Press the channel select button corresponding to the channel you wish to record.
   - The picture you are going to record will appear on the TV screen, but recording is not yet taking place.
   - If a clear picture or correct colour is not obtained, tuning may not have been done accurately. Re-perform tuning in the manner described in "HOW TO PRE-TUNE THE BUILT-IN TUNER" on pages 15 and 16.

Recording

1. Press the ENR. and LECTURE buttons ⑩ ⑭ simultaneously. Recording will start.
   - When these buttons are pressed, first the tape is pulled out from the cassette and loaded around the tape transport mechanism. During this period, the LECTURE indicator will flash.
   - Then recording starts while the tape is running. In this state, both the ENR. and LECTURE indicators remain lighted.
2. Set the NR switch ㊾ to MARCHE if you wish to make hiss-less recordings.
   - The Dolby NR indicator ③ will light.
3. To skip recording part of the programme, press the PAUSE/ARRET button ● . The tape will stop while remaining in the Record mode.
   - The PAUSE/ARRET indicator will light with also the ENR. and LECTURE indicators remaining lighted.
4. To release the Pause mode, press the LECTURE button ⑭.
5. To stop recording, press the ARRET button ● .
   - When the ARRET button is pressed, first the tape is unloaded from around the tape transport mechanism. During this period, the ARRET indicator will flash. When the tape has returned into the cassette, the indicator remains lighted.
   - When the end of the tape is reached during recording, the tape is automatically rewound to the beginning and stops. During rewinding, the RETOUR RAPIDE indicator lights and, when the tape reaches the beginning, the ARRET indicator lights.

Notes

- For using the tape counter, see page 31.
- If the ENR. button cannot be pressed, check to see if the cassette safety tab has been removed. (See page 3.)
- Sound from a microphone connected to the MICRO jack can be mixed with the TV sound being recorded.
- The Pause mode is released automatically after about 6 minutes in order to prevent tape damage and the Stop mode is engaged.
- The built-in automatic channel lock mechanism prevents the selected channel from being altered during recording. Therefore, if you wish to change the channel during recording, first engage the Pause mode and then select a different channel.
- For your reference, this automatic channel lock mechanism operates in the following cases:
  (1) when the sub-power switch is in the ARRET position,
  (2) in the Programme Set mode,
  (3) when the SELECT. ENR. switch is in the AUX or CAMERA position,
  (4) when a tape is being played back, and
  (5) in the Record mode.
  Because of this, when you set the sub-power switch to MARCHE after it has been set to ARRET, the same channel which was selected last will be received. The same applies to case (3). When you return the SELECT. ENR. switch to TUNER from AUX or CAMERA, the last channel is memorized.

HOW TO RECORD ONE TV PROGRAMME WHILE WATCHING ANOTHER

A programme, not being viewed, can be recorded while you enjoy viewing another programme. This permits the recorded programme to be played back later at your convenience. The recording procedures are exactly the same as when recording a TV programme while watching it.

The key points to be remembered are:

- Select the channel you wish to record with the recorder's channel select buttons ㊷ .
- Select the channel you wish to view with the TV receiver's channel selector.
- The VIDEO indicator ㊸ should be off. If it is lighted, press down the VIDEO/TV switch so that it extinguishes.

HOW TO RECORD A TV PROGRAMME FROM A MONITOR-RECEIVER

- Set the SELECT. ENR. switch ● to AUX.
- Select the channel you wish to record with the monitor-receiver's channel selector.

Other steps are identical to those for recording with the built-in tuner. However, when using a separate monitor-receiver, it is not possible to record one programme while watching another.

HOW TO PLAY BACK THE VIDEO CASSETTE

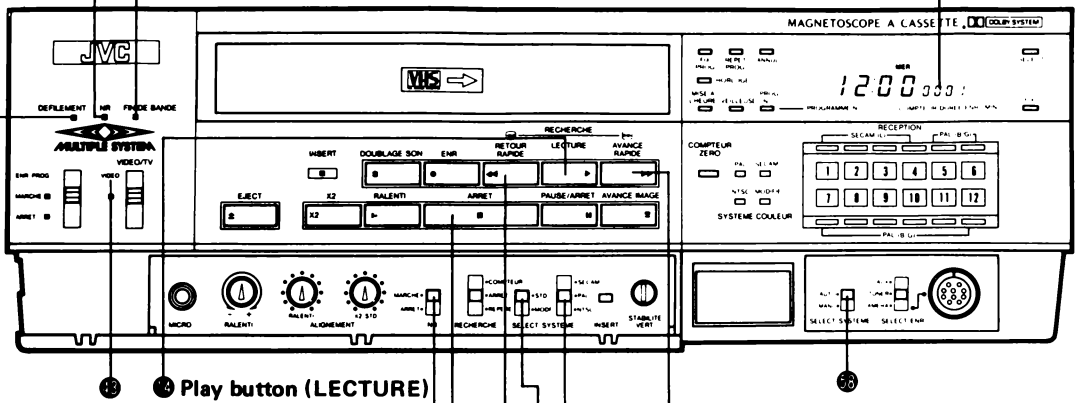
Basic guidelines

② **Tape run indicator (DEFILEMENT)**
Flashes to show that the tape is running. Its flashing interval is accelerated or decelerated according to the tape supply reel speed.

④ **Tape end indicator (FIN DE BANDE)**
Lights 10 minutes before the end of the tape and starts flashing 5 minutes before the end of the tape.

㉚ **Tape counter**
See page 31.

③ **Dolby NR indicator**



⑭ **Play button (LECTURE)**
To start playback.

⑪ **Stop button (ARRET)**
To stop playback.

⑫ **Rewind/Shuttle search button (RETOUR RAPIDE/RECHERCHE)**
To rewind the tape or to playback the tape at high speed in the reverse direction to locate the desired tape section.

⑬ **Fast forward/Shuttle search button (AVANCE RAPIDE/RECHERCHE)**
To fast forward the tape or to playback the tape at high speed in the forward direction to locate the desired tape section.

Confirm the settings of the SELECT. SYSTEME switches (51), (52) and (58) by referring to the chart on page 7.

Procedure

1. Set the sub-power switch ① to MARCHE.
   The VIDEO indicator (43) should be lighted. If not, press down the VIDEO/TV switch so that it lights.
2. Load a cassette.
3. Set the channel selector of your TV receiver to your VIDEO CHANNEL. (See page 14.)
   When using a monitor-receiver, select the A/V channel specified on the model being used.
4. Press the LECTURE button ⑭ .
5. Make sure that the Dolby NR indicator ③ lights if you play back tapes recorded with the NR switch on. If it does not light, open the sub-panel cover and set the NR switch (49) to MARCHE.
6. To stop playback, press the ARRET button ⑪ .
   - When the end of the tape is reached during playback, the tape is automatically rewound to the beginning.

Rewinding and fast forwarding the tape

- The same button is used for rewind and reverse shuttle search. To rewind the tape, press the RETOUR RAPIDE/RECHERCHE button ⑫ in the Stop mode. When the beginning of the tape is reached, the Stop mode is automatically engaged. If you wish to stop rewinding midway, press the ARRET button ⑪ .
- The same button is used for fast forward and forward shuttle search. To fast forward the tape, press the AVANCE RAPIDE/RECHERCHE button ⑬ in the Stop mode. When the end of the tape is reached, the tape automatically starts rewinding. If you wish to stop it midway, press the ARRET button ⑪ .

Shuttle search function

The unique "shuttle search" function permits you to reach quickly your desired tape section while following the playback picture on the TV screen. The tape speed is about 9 times the normal with PAL/SECAM tapes (about 7 times with NTSC tapes) and "search for a scene" is possible in both directions; either forward or reverse. This is why this function is named "shuttle search".

- After engaging the Play mode, press the AVANCE RAPIDE/RECHERCHE button ⑬ or RETOUR RAPIDE/RECHERCHE button ⑫ depending on the direction in which you are going to search for a particular scene and hold it until your desired scene appears on the screen. Releasing the button restores the normal Play mode.
- Since the audio circuit is switched off in this mode, you are free from "unintelligible" sound.

Notes

- For usage of the tape counter and RECHECHE switch, refer to page 31.
- If the playback picture contains noise bars, adjustment with the ALIGNEMENT controls may be necessary. Refer to page 31.
- NTSC tapes recorded in the LP (Long Play) or EP (Extended Play) mode cannot be played back on this unit. If playback is attempted with such a tape in the AUTO mode, the NTSC MODIFIE indicators will flash.
- PAL tapes recorded in the LP (Long Play) mode also cannot be played back on this unit.

HOW TO ENJOY VARIABLE-SPEED PLAYBACK

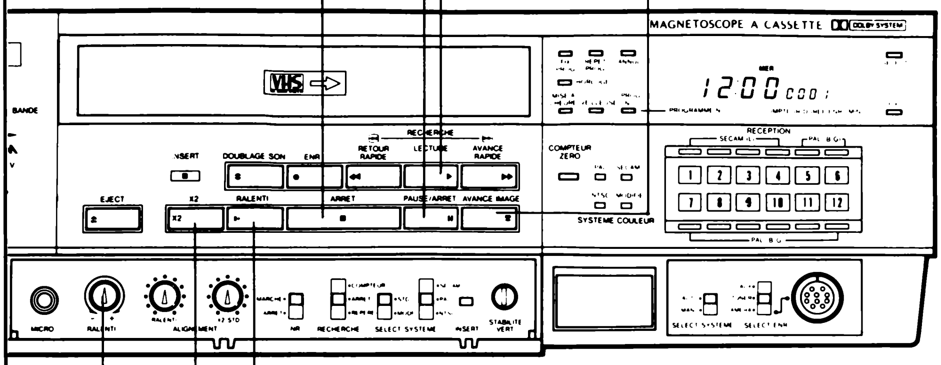
Basic guidelines

⓭ Stop button (ARRET)
To stop playback.

⓬ Pause/Still button (PAUSE/ARRET)
To view a still picture.

⓮ Play button (LECTURE)
To engage the Play mode.

⓯ Frame advance button (AVANCE IMAGE)
To view still pictures successively by advancing the tape by one frame at a time.



❽ Slow button (RALENTI)
To view slow-motion pictures at variable speeds.

❼ X2 button
To watch a programme in half the usual time.

⓰ Slow speed control (RALENTI)
To vary the slow-motion playback speed according to your needs.

To view still-frame, slow-motion or fast-motion playback, first you have to engage the Play mode by pressing the LECTURE button. Then any time you can switch to variable-speed playback by pressing the corresponding button.

Double-speed playback

- After engaging the Play mode by pressing the LECTURE button ⓮ , press the X2 button ❼. The X2 indicator will light and playback will take place at a speed twice the normal.
- To restore the normal playback speed, press the LECTURE button ⓮.
- This funciton will be especially convenient for quickly running through longer tape sections while at the same time following the contents until you reach the actual section you want to view at the normal speed.
- No audio is heard in the Double-speed mode.

Slow-motion playback

- After engaging the Play mode by pressing the LECTURE button ⓮, press the RALENTI button ❽. The RALENTI indicator will light and playback will take place at a slower speed.
- You can increase or decrease the slow-motion speed according to your needs. For this purpose, after engaging the Slow mode by pressing the RALENTI button ❽, open the sub-control panel cover and turn the RALENTI control ⓰ in either direction until you get the desired speed.
- To restore the normal playback speed, press the LECTURE button ⓮ .
- The slow-motion speed is variable from approx. 1/5 to 1/25 the normal.
- No audio is heard in the Slow-motion mode.
- The Slow-motion mode is released automatically after about 6 minutes in order to prevent tape damage and the Stop mode is engaged.

Still-frame playback

- After engaging the Play mode by pressing the LECTURE button ⓮, press the PAUSE/ARRET button ⓬. The PAUSE/ARRET indicator will light and the picture will "freeze" instantly.
- To release the Still mode, press the LECTURE button ⓮.
- The Still mode is released automatically after about 6 minutes in order to prevent tape damage and the Stop mode is engaged.

Frame advancing

- While in the Still mode, you can advance the picture frame by frame.
- Pressing the AVANCE IMAGE button ⓯ once, advances the picture by one frame.
- This function will be convenient to search for the precise instant of a crucial scene you wish to view.
- No indicator lights in the Frame Advance mode.

Notes

- During still-frame or slow-motion playback, the TV picture might vibrate horizontally. To reduce such vibrations, we recommend that you employ the AV channel for video playback if your TV receiver is provided with such. If the vibrations are rather excessive, consult your local JVC dealer.
- For tracking adjustment during double-speed or slow-motion playback, refer to page 31.

PART IV

ADVANCED USAGE

HOW TO PRESET THE TIMER FOR UNATTENDED RECORDING

Basic guidelines

㉘ Programme No. indicator (PROGRAMME Nº)
Displays the called-up programme number.

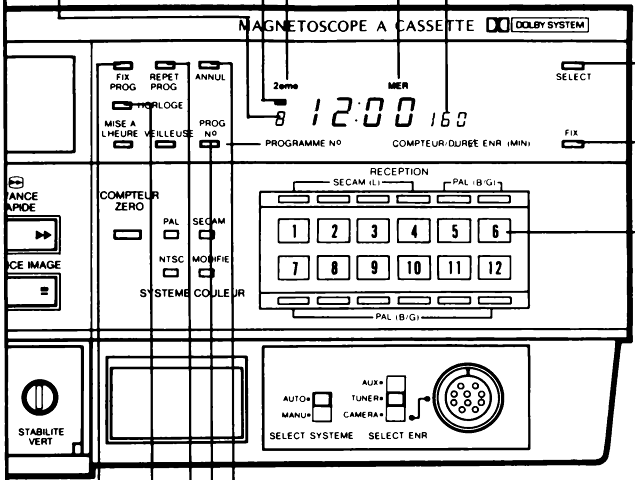
㉕ Programme repeat indicator

㉖ Week indicator

㉗ Day indicator

㉚ Counter/Recording length digits (COMPTEUR/DUREE ENR.)
Displays the recording length in minutes in the Programme Set mode.

㉜ Select button (SELECT.)
Selects the item for setting; "channel", "week", "day", "hour", "minute" and "recording length".


MAGNETOSCOPE A CASSETTE
DOLBY SYSTEM
FIX PROG
REPET PROG
ANNUL
HORLOGE
MISE A L'HEURE
VEILLEUSE
PROG Nº
2eme
MER
8 12:00 160
PROGRAMME Nº
COMPTEUR/DUREE ENR (MIN)
SELECT
FIX
RECEPTION
SECAM (L)
PAL (B/G)
1
2
3
4
5
6
7
8
9
10
11
12
PAL (B/G)
COMPTEUR ZERO
PAL
SECAM
NTSC
MODIFIE
SYSTEME COULEUR
ANCE
APIDE
CE IMAGE
STABILITE VERT
AUX
TUNER
CAMERA
AUTO
MANU
SELECT SYSTEME
SELECT ENR

㉝ Set button (FIX.)
Sets the required data for each called-up item.

㉛ Channel indicators
The selected channel to be recorded later will flash.

Timer recording is possible only when the built-in tuner is used.

㉓ Cancel button (ANNUL.)
To cancel the preset data.

㉒ Programme No. button (PROG. Nº)
To call up a programme memory on which recording data are to be entered.

㉑ Programme repeat button (REPET. PROG.)
For repeated pre-programmed recording.

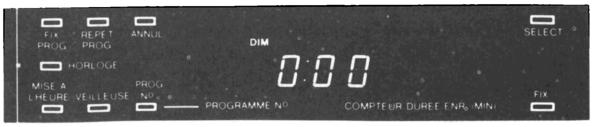
⑲ Clock button (HORLOGE)

● Programme set button (FIX. PROG.)
Engages the Programme Set mode.

The built-in 2-week/8-programme programmable timer permits recording of preset channels on preset days, at preset times for preset lengths while you are away. First preset the programmable timer and then operate the recorder section for unattended recording (this procedure is described in the next chapter). Guidelines for presetting the timer: Call up a programme number among 1 through 8 and enter the programming data with the SELECT. and FIX. buttons.

Procedure

1. Press the FIX. PROG. button ●.
   - The display will be changed from the Clock mode to the Programme Set mode.


FIX PROG
REPET PROG
ANNUL
HORLOGE
MISE A L'HEURE
VEILLEUSE
PROG Nº
DIM
0:00
PROGRAMME Nº
COMPTEUR DUREE ENR (MIN)
SELECT
FIX

- When the FIX. PROG. button is pressed, programme No. 1 is always called up first. If you wish to change the programme number, press the PROG. Nº button ㉒

2. Press the FIX. button ㉝ until the TV programme channel number you want to record is illuminated.
   - In the Programme Set mode, the channel select buttons are inoperative.
3. Press the SELECT. button ㉜, and then "1ere DIM" (meaning 1st Sunday) will start flashing.
4. Press the FIX. button ㉝ to specify the day.
   - Pressing it once advances the indication by one day and holding it pressed advances the indication rapidly.
   - The sequence of indication changing is: from Sunday to Saturday of the 1st week, then from Sunday to Saturday of the 2nd wek, then everyday from Sunday to Saturday of the 1st week, then returning to the original condition.
5. Press the SELECT. button ㉜, and then the "hour" digit will begin flashing.
6. Press the FIX. button ㉝ to obtain a desired hour indication.
7. Press the SELECT. button ㉜, and then the "minute" digits will begin flashing.
8. Press the FIX. button ㉝ to specify a desired minute indication.
9. Press the SELECT. button ㉜, and the recording length digits will begin flashing.
10. Press the FIX. button ㉝ to obtain a desired recording length.
    - The recording length can be set within 395 minutes in 5-minute steps.
11. Now you have finished presetting the timer for program "1". If you need to enter another preset programme, press the PROG. Nº button ㉒, and "2" will be displayed on the programme number indicator ㉔ for the next programme setting. You can follow the same procedure as instructed above.
12. When you have finished all necessary presettings to future programmes, set the HORLOGE button ⑲ to return to the Clock mode.
13. After having programmed the timer, be sure to load a cassette, make sure that the SELECT. ENR. switch (59) is set to TUNER and set the sub-power switch ❶ to ENR. PROG. following the instructions given below.

Repeating the preset programmes

- Normally the preset data are cleared after a recording has been made accordingly. However, if you wish to hold the preset data in memory in order for recordings to be made repeatedly according to this same data (for example, at the same time on the same day every week), press the REPET. PROG. button ㉑. The programme repeat indicator ㉕ will light.

Cancelling the preset programmes

- The preset programmes can be cancelled by pressing the ANNUL. button ㉓ after calling up the corresponding programme number on the display.
- If you wish to cancel all preset data for programmes 1 through 8, press the ANNUL. button ㉓ while simultaneously holding the PROG. Nº button ㉒. Then all programmes will be cleared and programme No. 1 will be displayed.

Notes

- During the Programme Set mode, if no command is entered within two minutes, the Clock mode will be automatically engaged. If you have not yet finished setting the programme, press the FIX. PROG. button once again.
- The preset data can be called up any time for checking by engaging the Programme Set mode and calling up the relevant programme number.
- If you wish to change the preset data partially, press the SELECT. button in the Programme Set mode until the corresponding item starts flashing on the display and enter the new data by pressing the FIX. button.
- It is impossible to alter the programmed data (except the recording length) during actual timer recording.
- The recording length can be changed even during timer recording by using the SELECT. and FIX. buttons in the Programme Set mode.
- If a power failure should occur (and last longer than about 10 minutes), not only time-keeping stops (see page 17), but also all the preset data will be cancelled. A flashing DIM 0:00 indicates this after power has been reapplied. In such cases, first correct the time indication and then re-enter the programming data.

HOW TO SET THE RECORDER FOR UNATTENDED RECORDING

After having programmed the timer, prepare the recorder section for unattended recording.

1. Set the sub-power switch ❶ to MARCHE.
2. Load a cassette.
   - Make sure that the tape length is sufficient for the sum of your intended recordings.
   - Make sure that the safety tab of the cassette is in place.
3. Make sure that the SELECT. ENR. switch (59) is set to TUNER.
4. Set the sub-power switch ❶ to ENR. PROG.
   - If the safety tab of the cassette has been removed, the cassette is automatically ejected when the sub-power switch is set to ENR. PROG.

Now preparations for unattended recording are complete; when the preset switch-on time is reached, recording will start automatically. There is no need to press the ENR. and LECTURE buttons to engage the Recording Standby mode.

Notes

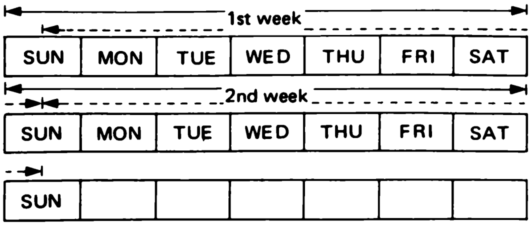
- Tape loading starts 10 seconds before the preset switch-on time and recording starts exactly at the preset time.
- If the end of the tape is reached during timer recording, the auto rewind mechanism does not function and the cassette is automatically ejected.
- After the unattended recording has been made, set the sub-power switch to ARRET.

FOR A BETTER UNDERSTANDING OF THE PROGRAMMABLE TIMER

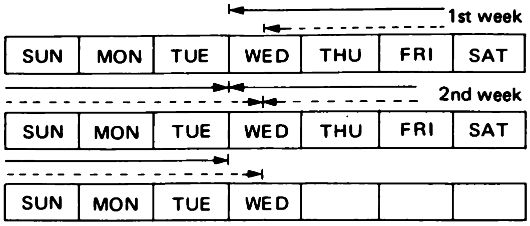
Two-week timer

"Two-week" presetting capacity means that you can "reserve" recordings on any one of 14 days in advance including the day of setting.

If the current day of setting is Sunday:



If the current day of setting is Wednesday for example:



- In this situation, there may be no possibility of confusion in setting the day.
- Namely, the "1ere LUN" is Monday of the current week and the "2eme LUN" is Monday of the next week. The same applies to other week days.
- Regarding Sunday, there are two different cases; one is that you are going to set the timer to a time before the current time of setting and the other is that the preset time is a time after the current time of setting.
- In the former case, the "1ere DIM" is the next Sunday and the "2eme DIM" is the Sunday after next.
- In the latter case, the "1ere DIM" is the current Sunday and the "2eme DIM" is Sunday of the next week.

- Remember that the "1ere LUN", "1ere MAR" and so on . . . mean the first coming Monday, the first coming Tuesday, and so on, and not Monday of the current week.
- Similarly, the "2eme LUN", "2eme MAR" and so on . . . are the second coming Monday, the second coming Tuesday, and so on, and not Monday or Tuesday of the next week.
- If you are presetting on Wednesday for example, and wish to record something on Tuesday of the next week, the preset data should be "1ere MAR". To record on Thursday of the next week, set "2eme JEU".
- Regarding Wednesday, the same as mentioned about Sunday on the left applies.

8-programme timer

"8-programme" presetting capacity means that you can have 8 separate programme entries which contain different programming data. Because of this capacity, you can even "reserve" 8 different TV programmes, either on the same day or on different days.

Each programme (No. 1 through No. 8) entry contains information on "TV programme channel number", "day", "switch-on time", recording length" and "either single or repeat".

Example of the contents of one programme entry:

Programme number	TV programme channel number	Day	Switch-on time	Recording length	Repeat
2	12	1st WED	12 : 30	30 min.	–

Variety of setting possibilities

- You can set for some day of the 1st week or the 2nd week.
- You can set for one day of every week by first setting that day of the 1st week and pressing the REPET. PROG. button.
- You can set for one day of every week starting from the second week by first setting that day of the 2nd week and pressing the REPET. PROG. button.
- You can set for all days of the 1st week. For this setting, obtain the indication "1ere DIM LUN MAR MER JEU VEN SAM", and recordings will be repeated at the same time everyday for one week.
- You can set for all days week after week. For this setting, first obtain the indication as mentioned above and then press the REPET. PROG. button. And recordings will be made everyday week after week.
- All the above applies for all 8 programme entries.

Programme priority

- If you have preset two programmes for the same day and the same switch-on time, the setting corresponding to the smaller programme number has priority.
- If two programmes have preset times which overlap, the earlier-started programme will be interrupted by the latter one.
- When a certain preset time is reached in the Sleep Timer mode, the Sleep Timer mode has priority.

HOW TO USE THE SLEEP TIMER FACILITY

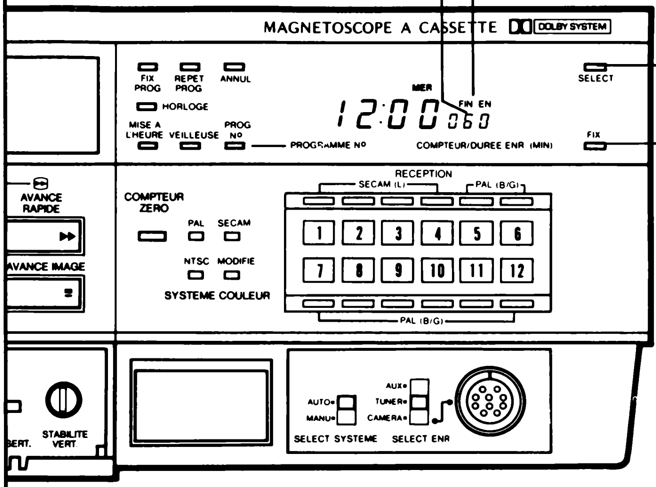
Basic guidelines

㉚ **Counter/Recording length digits (COMPTEUR/DUREE ENR.)**
For setting the period of time after which the power is automatically switched off.

㉛ **Sleep indicator (FIN. EN)**
The word "FIN. EN" is illuminated in the Sleep Timer mode.

㉜ **Select button (SELECT.)**
Enables the recording length digits to flash so that they can be changed.

㉝ **Set button (FIX.)**
Sets the required time for the Sleep Timer mode to continue.


MAGNETOSCOPE A CASSETTE
DOLBY SYSTEM
FIX PROG
REPET PROG
ANNUL
HORLOGE
MISE A L'HEURE
VEILLEUSE
PROG Nº
12:00 060
FIN EN
SELECT
FIX
PROGRAMME Nº
COMPTEUR/DUREE ENR (MIN)
AVANCE RAPIDE
AVANCE IMAGE
COMPTEUR ZERO
PAL
SECAM
NTSC
MODIFIE
SYSTEME COULEUR
RECEPTION
SECAM (L)
PAL (B/G)
1
2
3
4
5
6
7
8
9
10
11
12
PAL (B/G)
STABILITE VERT.
AUTO
MANU
AUX
TUNER
CAMERA
SELECT SYSTEME
SELECT ENR

The built-in sleep timer facility allows recording to stop automatically after a certain period of time. Start recording in an ordinary manner, then shift the sub-power switch to ENR. PROG. and set the switch-off time.

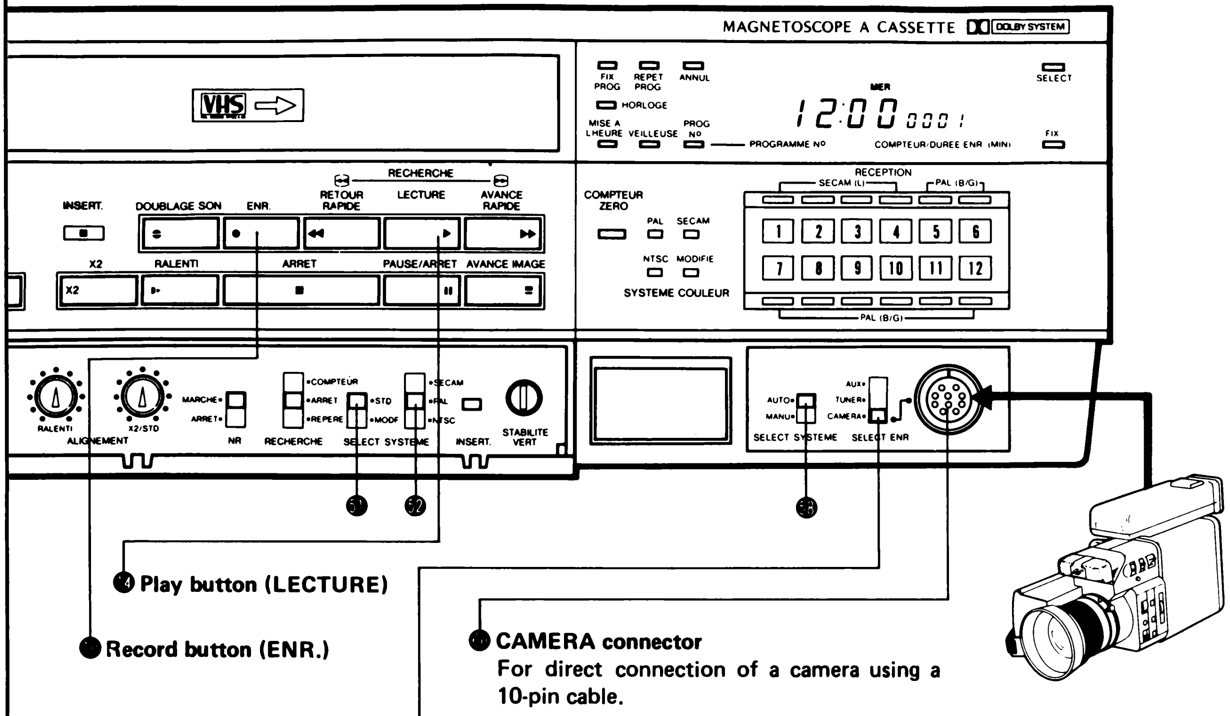
Procedure

1. Set the sub-power switch ❶ to MARCHE.
2. Load a cassette.
   - Make sure that the safety tab of the cassette is in place.
3. Start recording in the manner described before.
4. Shift the sub-power switch ❶ to ENR. PROG.
   - The FIN. EN indicator ㉛ will be illuminated and the figures "060" will appear on the recording length indicator. This means that power will be switched off automatically after 60 minutes.
5. If you want to change the length of time, press the SELECT. button ㉜.
   - The digits will start flashing.
6. Press the FIX. button ㉝ to obtain a desired length of time.
   - The length of time can be set within 395 minutes in 5-minute steps.
7. Press the SELECT. button ㉜ once again, and the digits will stop flashing and the Sleep Timer mode will be engaged.

After a preset time, power will be switched off automatically. If the end of the tape is reached during recording in the Sleep Timer mode, the automatic rewind mechanism does not function and the cassette is automatically ejected.

HOW TO RECORD WITH A VIDEO CAMERA

Basic guidelines


MAGNETOSCOPE A CASSETTE
VHS
FIX PROG
REPET PROG
ANNUL
HORLOGE
MISE A L'HEURE
VEILLEUSE
PROG NO
12:00 0001
PROGRAMME NO
COMPTEUR/DUREE ENR (MIN)
SELECT
FIX
RECHERCHE
INSERT.
DOUBLAGE SON
ENR.
RETOUR RAPIDE
LECTURE
AVANCE RAPIDE
X2
RALENTI
ARRET
PAUSE/ARRET
AVANCE IMAGE
COMPTEUR ZERO
PAL
SECAM
NTSC
MODIFIE
SYSTEME COULEUR
RECEPTION
SECAM (L)
PAL (B/G)
1
2
3
4
5
6
7
8
9
10
11
12
RALENTI
X2/STD
ALIGNEMENT
MARCHE
ARRET
NR
COMPTEUR
ARRET
REPERE
RECHERCHE
STD
MODF
SECAM
PAL
NTSC
SELECT SYSTEME
INSERT.
STABILITE VERT
AUTO
MANU
SELECT SYSTEME
AUX
TUNER
CAMERA
SELECT ENR
(51)
(52)
(53)

⑭ **Play button (LECTURE)**

● **Record button (ENR.)**

● **CAMERA connector**
For direct connection of a camera using a 10-pin cable.

● **Recording select switch (SELECT. ENR.)**
Setting to CAMERA enables signals from the camera connected to the CAMERA connector to be recorded.

When a camera is connected to the CAMERA connector and the SELECT. ENR. switch is set to CAMERA, it is powered through the recorder and scenes being shot by the camera will appear on the TV screen.

Procedure

1. Connect a camera.
2. Press the sub-power switch ① to MARCHE.
3. Switch on the TV receiver.
4. Set the TV receiver's channel selector to your VIDEO CHANNEL.
5. The VIDEO indicator ⑬ should be lighted. If not, press down the VIDEO/TV switch so that it lights.
6. Set the SELECT. ENR. switch ● to CAMERA.
   - You can monitor the scenes being shot by the camera.
7. Load a cassette.
8. Press the ENR. and LECTURE buttons ● ⑭ simultaneously. The recorder enters the Recording Standby mode.
   - When a camera is connected, starting or stopping of the tape is remote-controlled by the camera. Therefore, pressing the ENR. and LECTURE buttons does not yet start the tape-running operation.
9. Operate the camera's start/stop switch. Now recording will start.

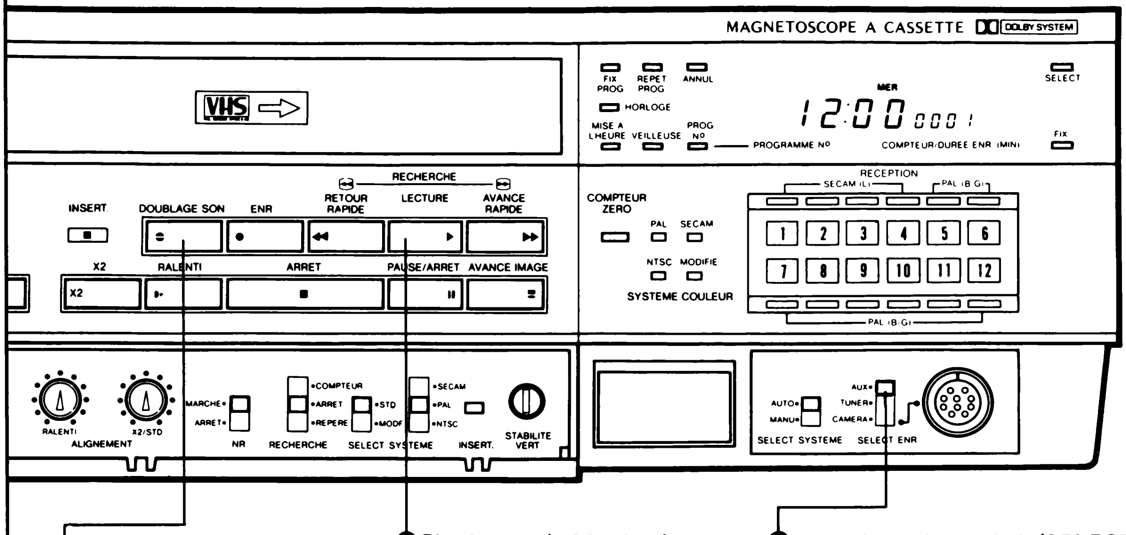
Notes

- If feedback noise (whistling or howling) is heard from the TV receiver, reduce the volume or move the microphone, either external or built within the camera, farther away from the TV receiver.
- Power to the camera is switched on or off with the sub-power switch or by using the built-in timer.
- With some cameras, their battery warning indicator may flicker, however, no problem occurs with recording as long as the picture being monitored on the TV screen appears normal.

Confirm the signal system of the camera being used and set the SELECT. SYSTEME switches (51), (52) and (53) correctly to suit the camera by referring to the chart on page 7.

HOW TO PERFORM AUDIO DUBBING

Basic guidelines


MAGNETOSCOPE A CASSETTE DOLBY SYSTEM
VHS
FIX PROG
REPET PROG
ANNUL
SELECT
HORLOGE
MISE A L'HEURE
VEILLEUSE
PROG No
12:00 0001
PROGRAMME No
COMPTEUR/DUREE ENR (MIN)
FIX
INSERT
DOUBLAGE SON
ENR
RECHERCHE
RETOUR RAPIDE
LECTURE
AVANCE RAPIDE
X2
RALENTI
ARRET
PAUSE/ARRET
AVANCE IMAGE
COMPTEUR ZERO
PAL
SECAM
NTSC
MODIFIE
SYSTEME COULEUR
RECEPTION
SECAM (L)
PAL (B G)
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11
12
RALENTI
X2/STD
ALIGNEMENT
MARCHE
ARRET
NR
COMPTEUR
ARRET
REPERE
RECHERCHE
STD
MODF
SELECT SYSTEME
SECAM
PAL
NTSC
INSERT.
STABILITE VERT
AUTO
MANU
AUX
TUNER
CAMERA
SELECT SYSTEME
SELECT ENR

⑭ **Play button (LECTURE)**

⑨ **Audio dub button (DOUBLAGE SON)**
To start audio dubbing.

(34) **Recording select switch (SELECT. ENR.)**
Setting to AUX enables signals from audio equipment connected to the rear panel AUDIO connector to be recorded.

Audio dubbing means recording a soundtrack on a pre-recorded cassette. Sound from a source connected to the rear panel AUDIO connector, or from a microphone connected to the front panel MICRO jack, or a mixture of the two can be recorded. The previously recorded sound is erased and replaced with a new soundtrack by audio dubbing.

Procedure

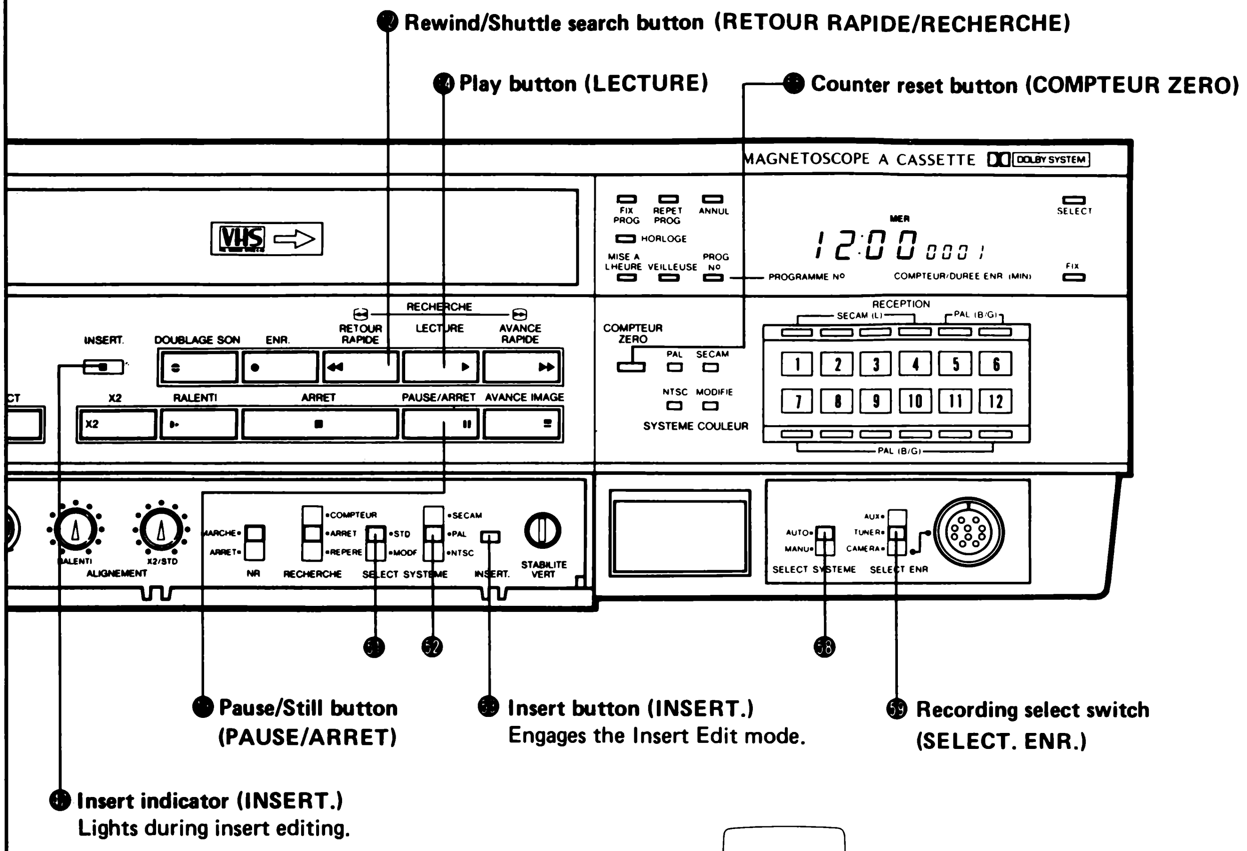
1. Load a pre-recorded cassette.
2. Set the TV receiver's channel selector to your VIDEO CHANNEL to monitor the playback picture while dubbing audio.
3. The VIDEO indicator ⑬ should be lighted. If not, press down the VIDEO/TV switch so that it lights.
4. Set the SELECT. ENR. switch (34) to AUX.
   - If you record sound only from the microphone, this switch has no effect and may be in any position.
5. Press the DOUBLAGE SON and LECTURE buttons ⑨ ⑭ simultaneously. The DOUBLAGE SON and LECTURE indicators will light and audio dubbing will start.

Notes

- Use a high-impedance microphone.
- If whistling or howling is heard during audio dubbing, reduce the TV volume or move the microphone farther away from the TV. Recording is being performed even if sound is not heard from the TV receiver. If you want to monitor the sound being recorded, connect an earphone to the TV receiver.
- The pause function facilitates audio dubbing. First play back the pre-recorded tape and press the PAUSE/ARRET button at the point from which you wish to start audio dubbing. If necessary, adjust the point by using the AVANCE IMAGE button. Then press the DOUBLAGE SON and LECTURE buttons simultaneously. This permits you to start audio dubbing exactly at the right point.
- Even though you are playing back the tape in the Double-Speed (X2) mode, normal speed is automatically resumed when the Audio Dub mode is engaged.

HOW TO PERFORM INSERT EDITING

Basic guidelines


Rewind/Shuttle search button (RETOUR RAPIDE/RECHERCHE)
Play button (LECTURE)
Counter reset button (COMPTEUR ZERO)
MAGNETOSCOPE A CASSETTE
VHS
FIX PROG
REPET PROG
ANNUL
HORLOGE
MISE A L'HEURE
VEILLEUSE
PROG No
PROGRAMME No
COMPTEUR/DUREE ENR (MIN)
SELECT
FIX
12:00 0001
RECHERCHE
RETOUR RAPIDE
LECTURE
AVANCE RAPIDE
INSERT.
DOUBLAGE SON
ENR.
X2
RALENTI
ARRET
PAUSE/ARRET
AVANCE IMAGE
COMPTEUR ZERO
PAL
SECAM
NTSC
MODIFIE
SYSTEME COULEUR
RECEPTION
SECAM (L)
PAL (B/G)
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5
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9
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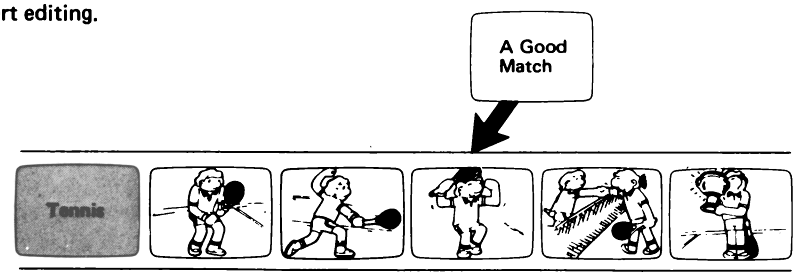
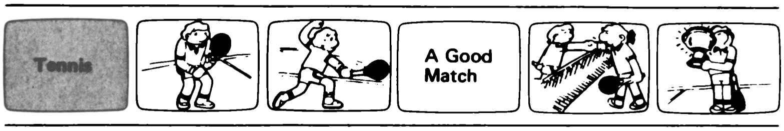
11
12
RALENTI
X2/STD
ALIGNEMENT
MARCHE
ARRET
NR
COMPTEUR
ARRET
REPERE
RECHERCHE
STD
MODF
SECAM
PAL
NTSC
SELECT SYSTEME
INSERT.
STABILITE VERT
AUTO
MANU
SELECT SYSTEME
AUX
TUNER
CAMERA
SELECT ENR
52
58
Pause/Still button (PAUSE/ARRET)
Insert button (INSERT.)
Engages the Insert Edit mode.
59 Recording select switch (SELECT. ENR.)
Insert indicator (INSERT.)
Lights during insert editing.


A Good Match
Tennis

Original tape


Tennis
A Good Match

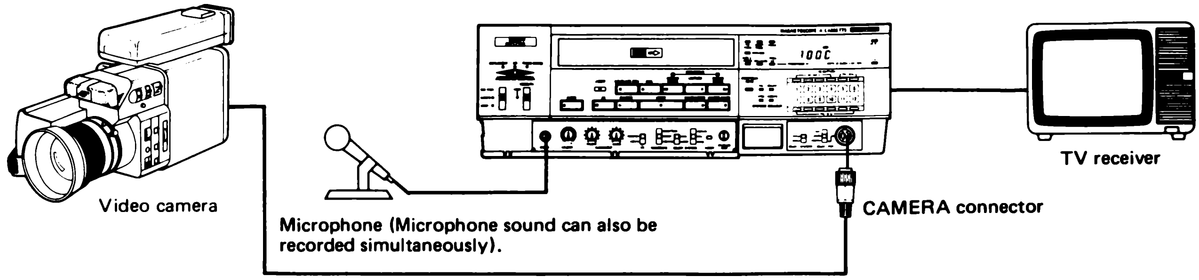
Edited tape

Insert editing means recording a new scene into a section of pre-recorded tape so that a part of the original recording can be replaced with a new one without excessive picture distortion at edit-in and edit-out points.

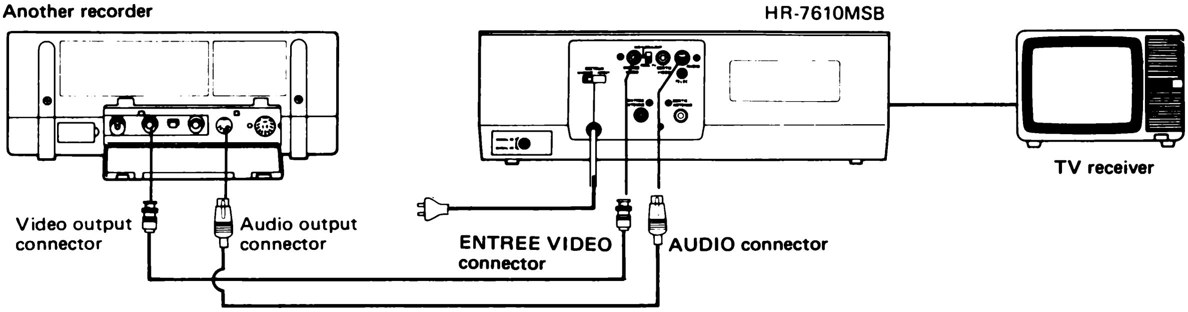
New video and audio signals to be inserted can come either from a video camera or another video cassette recorder, or even from the built-in tuner.

Connections

For inserting video and audio signals from a camera connected to the CAMERA connector.


Video camera
Microphone (Microphone sound can also be recorded simultaneously).
CAMERA connector
TV receiver

For inserting video and audio signals from another video cassette recorder.



Satisfactory insert editing is possible only when the new signal to be inserted and the signal pre-recorded on the tape have the same signal system.

Procedure

1. Load a pre-recorded cassette.
2. Set the TV receiver's channel selector to your VIDEO CHANNEL to monitor the playback picture.
3. The VIDEO indicator ㊸ should be lighted. If not, press down the VIDEO/TV switch so that it lights.
4. Set the SELECT. ENR. switch (59) as required.
   AUX: To insert programmes from a different tape.
   TUNER: To insert TV programmes from the built-in tuner.
   CAMERA: To insert camera signals from a camera connected to the CAMERA connector.
5. Play back the tape to determine the edit-out point (the end of the tape section to be replaced).
6. Press the PAUSE/ARRET button ⑬ at the edit-out point.
7. Reset the tape counter to "0000" by pressing the COMPTEUR ZERO button (55) .
8. Run the tape backwards by pressing the RETOUR RAPIDE/RECHECHE button ⑫ to determine the edit-in point (the beginning of the tape section to be replaced).
9. Press the PAUSE/ARRET button ⑬ at the edit-in point.
10. Press the PAUSE/ARRET button ⑬ and the INSERT. button (58) simultaneously. This engages the Insert Standby mode in which the input signal can be monitored on the TV screen; the still picture changes into the input signal that you are going to record. The input sound signal can also be monitored. The INSERT. indicator ㊼ will light.
11. Operate the source equipment properly.
    - Play back on another video recorder the tape programme to be inserted.
    - Select the channel to be recorded with the corresponding channel select button.
    - Operate the camera.
12. Press the LECTURE button ⑭ to start insert editing. Now video and audio signals will be recorded simultaneously.
13. At the counter reading of "0000", recording will stop automatically and the INSERT. indicator will turn off.
14. The tape will continue running in the Play mode.

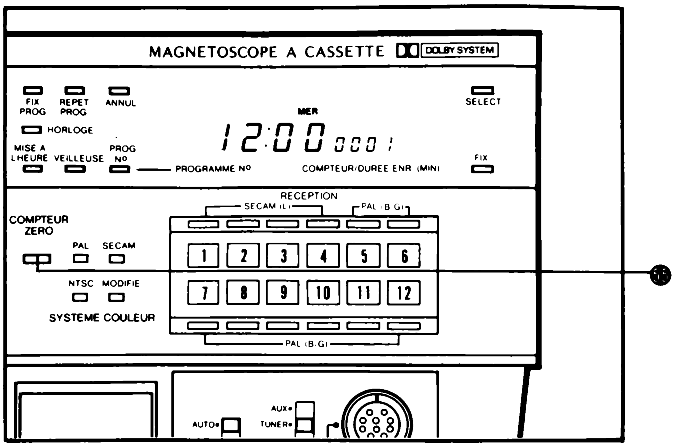
Notes

- Do not use the ARRET button to stop insert editing.
  If you press the ARRET button, the tape stops and the Insert Edit mode is cancelled.
- If there happens to be a non-recorded segment on the pre-recorded tape on which you are going to insert new material, the picture will be distorted temporarily at this segment during playback.
- The insert edit is not of the professional type. Therefore, the results very much depend on the previously recorded signal, whether colours are stable or fluctuate slightly. This is not due to any defect of the unit.
- Do not repeat insert editing onto the same section of the tape, as this will degrade the picture quality.

PART V

ADDITIONAL FACILITIES

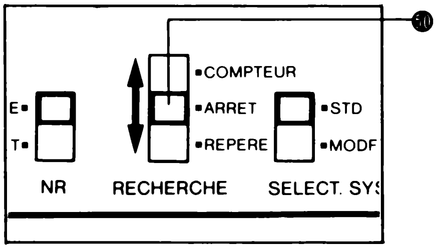
HOW TO USE THE TAPE COUNTER


MAGNETOSCOPE A CASSETTE
DOLBY SYSTEM
FIX PROG
REPET PROG
ANNUL
SELECT
HORLOGE
MER
MISE A L'HEURE
VEILLEUSE
PROG Nº
12:00 000 1
PROGRAMME Nº
COMPTEUR/DUREE ENR (MIN)
FIX
RECEPTION
SECAM (L)
PAL (B.G)
COMPTEUR ZERO
PAL
SECAM
NTSC
MODIFIE
SYSTEME COULEUR
1
2
3
4
5
6
7
8
9
10
11
12
PAL (B.G)
AUX
AUTO
TUNER
(55)

The tape counter is helpful for tape indexing. When the sub-power switch ❶ is set to ON, the display shows the tape counter beside the clock time.

- The tape counter functions in all tape modes.
- Pressing the COMPTEUR ZERO button (55) resets the counter reading to nearly "0000".
- When used in conjunction with the RECHERCHE switch ㊿, counter search function is available (see next chapter).

HOW TO USE THE SEARCH SWITCH


㊿
COMPTEUR
ARRET
REPERE
E
T
STD
MODF
NR
RECHERCHE
SELECT. SY

To search for a specific tape section, you can apply either the Counter Search or Cue Search mode.

Counter search

When the RECHERCHE switch ㊿ is set to COMPTEUR, the point corresponding to the counter reading of nearly "0000" is automatically located in the Fast Forward or Rewind mode. Therefore, its typical use may be: (1) press the COMPTEUR ZERO button at the start of playback and (2) after playback, rewind the tape. Then the tape automatically stops when the counter reaches nearly "0000", facilitating the location of the tape section you want to play back again.

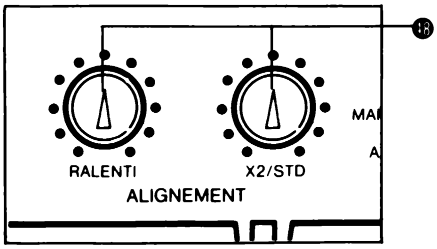
Cue search

At the beginning of every recording, a cue signal is recorded on the tape. The cue search function enables the sensing of this cue signal and stops the tape at a point where a new recording was made. Similarly to the counter search function, this mode is applicable only in the Fast Forward and Rewind modes. If you wish to view the recorded material immediately after it was made, set the RECHERCHE switch ㊿ to REPERE. After recording, if you rewind the tape, it stops automatically where the recording was initiated (the cue signal position).

Notes

- The cue signal is recorded in the following cases:
  - (1) When a recording is initiated from the Stop mode (ARRET to ENG.).
  - (2) When a timer recording is initiated (ENR. PROG. to ENR.).
  - (3) When a recording is initiated from the Play mode by pressing the LECTURE button together with the ENR. button (LECTURE to ENR.).

HOW TO USE THE TRACKING CONTROLS

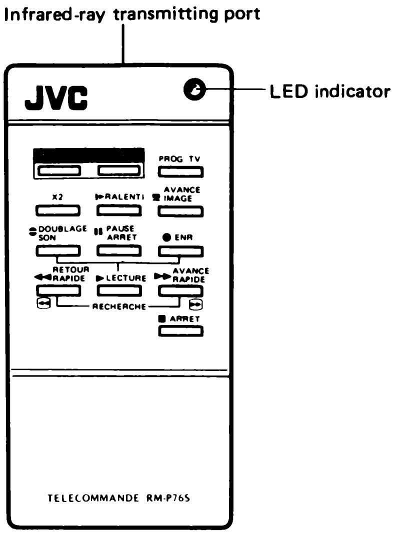

⓲
RALENTI
X2/STD
ALIGNEMENT
MA
A

If the playback picture contains noise bars (this is likely to happen when you play back a cassette which was recorded with a different video recorder unit), adjust the ALIGNEMENT controls ⓲, X2/STD control during playback at normal and double-speed and RALENTI control during slow-motion playback. Turn them slowly in either direction until the noise bars are minimized on the screen.

Note

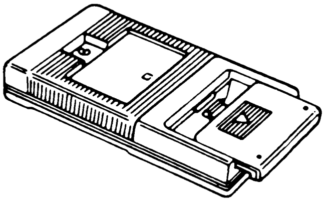
After playing back that particular cassette, be sure to return the ALIGNEMENT controls to their centre position.

HOW TO USE THE REMOTE CONTROL UNIT

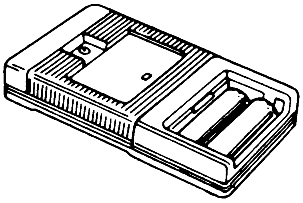


Installing the batteries

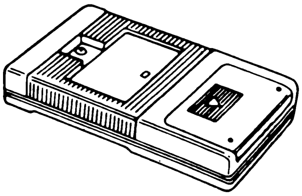
1. Slide the battery compartment cover on the rear of the unit in the direction of the arrow (►).



2. Insert 2 "R6"-size batteries (provided) in the correct directions into the battery compartment.



3. Replace the cover.



- If the LED indicator fails to light when one of the buttons is pressed after the remote control unit has been used for a long time, the battery power is insufficient. Replace all 2 batteries with fresh ones following the instructions.

Features

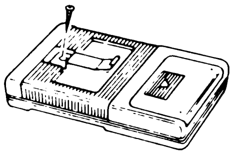
- This remote control employs infrared-ray transmission.
- Main operational buttons on the recorder are duplicated on the remote control unit for at-a-distance operation.
- This remote control can operate the recorder from a distance of up to 10 m.
- All tape control modes (except EJECT) and TV programme channel selection are possible via the remote control unit.

Operation

- Direct the infrared-ray transmitting port toward the recorder's receiving window.
- The function of each button is exactly the same as that of the corresponding button on the recorder.
- For TV programme channel selection, press the PROG. TV button a number of times.
- The LED indicator on the remote control unit lights to indicate that it is transmitting a signal.
- If some channels are skipped, you don't have to press the PROG. TV button of the remote control unit a number of times to reach your desired channel.

Notes

- Do not attempt to press two buttons simultaneously (except LECTURE and ENR. or LECTURE and DOUBLAGE SON), otherwise malfunctioning may result.
- When you have switched the power off via the remote control unit, even though the recorder's sub-power switch is in the MARCHE position, the recorder is inoperative (with the power indicator turned off). To re-apply power to the recorder, either press the MARCHE button on the remote control unit or first set the recorder's sub-power switch to ARRET and then set it to MARCHE once again.
- The metal latch provided permits the remote control unit to be hooked onto various places. Attach it as illustrated.



Specifications

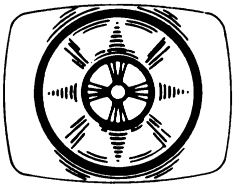
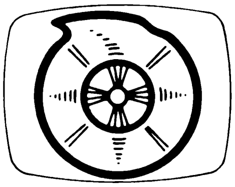
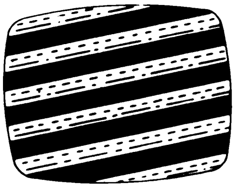
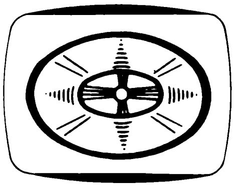
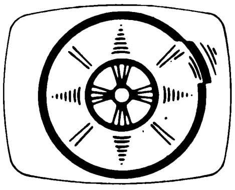
Power supply : 3 V ⎓ ("R6" battery x 2)
Dimensions : 63 mm(W) x 130 mm(H) x 21 mm(D)
Weight : 120 g (incl. batteries)
Operating distance : 10 m max.

PART VI

SUPPLEMENTS

ADJUST YOUR TV RECEIVER WHEN...

Speed or Still Playback may require adjusting your TV receiver. If your TV receiver shows the following symptoms during Speed Playback or Still Playback using the HR-7610MSB, adjust the TV receiver first.

Symptom	Adjustment
Picture vibrates vertically. 	Turn the V-Hold knob slightly for stabilizing.*
The upper portion of the picture drifts horizontally. 	Turn the H-Hold knob slightly for stabilizing.**
Picture rolls. 	Turn the H-Hold knob slightly for stabilizing.**
Picture is flattened vertically. 	Inherent in your TV receiver.
Only a portion of the picture continues to flicker. 	Not adjustable. Inherent in your TV receiver.

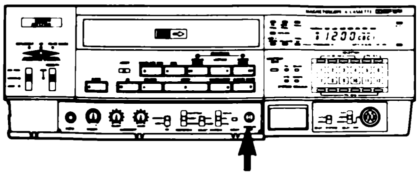
HEAD CLEANING

- Picture playback may become blurred or interrupted while the TV programme received is clear. This does not mean that the recorded programme has been erased.
- Dirt accumulated on the head after long periods of use causes such troubles. In this case, head cleaning requiring highly technical care is necessary.

*For head cleaning, consult the nearest JVC dealer.

If the V-Hold and H-Hold knobs are not provided on your TV receiver, please consult your JVC dealer.

*If an unsatisfactory result is obtained, adjust the Vertical-hold control knob (STABILITE VERT.) located on the sub-control panel of the unit so that a stable picture is obtained.



**If an unsatisfactory result is obtained, it is necessary to adjust the AFC circuit of the TV receiver.

IN CASE OF DIFFICULITY

What may initially appear to be trouble is not always a real problem. Make sure first . . .

Symptoms	Check points
No power is applied to the set.	● Is the power cord disconnected? – Connect it. ● Is the rear panel SECTEUR switch set to ARRET? – Set to MARCHE.
Clock is functioning properly, but the set is not powered with the recorder's sub-power switch set to MARCHE.	● Have you switched the power off last via the infrared remote control unit? – If so, set the recorder's sub-power switch to ARRET once and then set it to MARCHE again. – Or simply press the remote control unit's MARCHE button.
Playback picture does not appear while the tape is running.	● Is the TV receiver's channel selector set to the correct video channel? – Set to the RF converter channel. (See page 14.)
ENR. or DOUBLAGE SON cannot be pressed in.	● Is the safety tab on the video cassette broken? – Reseal the slot with cellophane tape.
Tape stops unexpectedly.	● Check the setting of the RECHERCHE switch. See page 31.
Buttons for variable-speed playback do not function.	● Have you pressed the LECTURE button first? – If not, press it.
Noise such as whistling or howling is heard from TV while audio dubbing or camera recording.	● Move microphone or camera away from TV or reduce TV sound volume.
No colour or rolling picture.	● Is the video mode select switch (on the rear panel) set to COULEUR? ● Are the SELECT. SYSTEME switches set correctly? (See page 7.)
Channel cannot be switched.	● Is recording in process? – During recording, you cannot change the channel.
Channel cannot be changed during pretuning.	● Have you turned the tuning control while the indicator is still blinking? – If so, you cannot select any other channel. See page 16.

SPECIFICATIONS

General

Power requirement	: 220 V∿, 50/60 Hz
Power consumption	: 45 watts (60 W with camera)
Camera connector output	: 12 V ⎓ , 1 A max
Temperature	: Operating: 5°C to 40°C Storage: –20°C to 60°C
Operating position	: Horizontal only
Weight	: 12 kg
Dimensions	: 460(W) x 154(H) x 371(D) mm

Tape deck section

Format	: VHS standard
Video signal system	: PAL and SECAM colour and CCIR monochrome signals, 625 lines NTSC (4.43 MHz) colour and EIA monochrome signals, 525 lines
Video recording system	: Luminance: FM recording Colour: Phase shift & converted subcarrier direct recording (PAL/NTSC) 1/4 frequency count down and direct recording (SECAM)
Scanning system	: Rotary, slant azimuth, two-head helical scan system
Tape width	: 12.65 mm
Tape speed	: 23.39 mm/sec (PAL/SECAM) 33.35 mm/sec (NTSC)
Playing time	: 240 minutes with E-240 (PAL/SECAM) 160 minutes with T-160 (NTSC)
Video input	: 0.5 to 2.0 Vp-p/75 ohms
Video output	: 1.0 Vp-p, 75 ohms
Video S/N	: 43 dB (PAL/SECAM), 45 dB (NTSC) (with Rohde & Schwarz noise meter)
Resolution of picture	: More than 250 lines (PAL) More than 240 lines (NTSC/SECAM)
Audio mic input	: –67 dBs/high impedance, unbalanced
Audio line input	: –20 dBs/50 k-ohms, unbalanced
Audio output level	: –6 dBs, high impedance load
Audio output impedance	: 1 k-ohm, unbalanced
Audio frequency range	: 70 Hz – 10 kHz
Audio S/N	: More than 48 dB (Noise reduction on)

TV tuner/RF section

Channel storage capacity	: SECAM 4 channels PAL 8 channels
Antenna input	: VHF band I, PAL 47 – 118 MHz VHF band III, PAL 118 – 300 MHz (SECAM channels 1 – 6) UHF band IV/V, PAL 470 – 862 MHz (SECAM channels 21 – 69)
Antenna output	: UHF channels 32 – 40 (Adjustable)

Digital clock/timer

Clock display	: 24-hour fluorescent digital display with day indication
Reference frequency	: Quartz controlled
Start time setting	: Within 2 weeks
Programming capacity	: 8 programmes
Accessories	: Antenna cable Video cassette Infrared remote control unit "R6" battery x 2 Metal latch
Optional accessory	: Wired remote control unit (RM-P73U)

Design and specifications subject to change without notice.

SECTION 1
GENERAL

This model is based on the HR-7610MS. Therefore this manual contains only the essential adjustment and replacement procedures required for routine servicing. If a detailed technical description is necessary, please refer to the HR-7610MS Service Manual.

SECTION 2
MECHANICAL ADJUSTMENT

2.1 GENERAL

2.1.1 Precautions

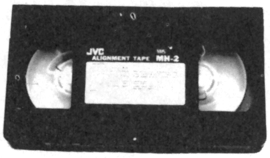
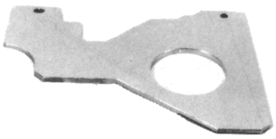
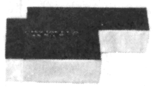
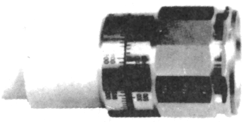
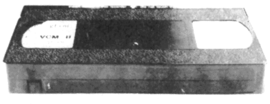
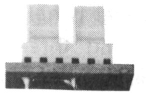
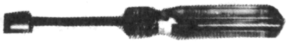
IMPORTANT:

1. Disconnect from power before removing or soldering components.
2. When removing a screw from the chassis, be careful not to drop it into the mechanism. If a screw should be dropped, be sure to retrieve it.
3. Be extremely careful not to damage either the upper or lower head drum assemblies.
4. The tape transport mechanism has been precisely adjusted at the factory and ordinarily does not require readjustment.
5. When removing a part, be very careful not to damage or displace other parts. (Be especially careful with the guide poles and rotary video head drum.)
6. The cassette switch is mounted to the cassette housing. Therefore, the set cannot be operated without the cassette housing (i.e., while cap housing of the cassette housing is disengaged). Therefore, to operate the set without the cassette housing, set the cassette switch short jig (part no. PUJ43068) so as to press the cap housing inward. Also disable the photo transistor sensors by applying opaque covers. After completing checks and repairs, be sure to remove the covers.
7. When raising the set on its side, it is better for stability not to remove the front panel.
8. Tighten the screws carefully to avoid damage to the cabinet.

2.1.2 Required jigs and tools

For proper mechanical adjustment, the following jigs and tools are strongly recommended. Without them, a long trial-and error period would be necessary.

In addition, general-purpose tools and a metric hex key (not supplied by JVC) are required.
The hex key needed for this model is 1.5 mm size.

JVC Alignment tape MH-2 	Master plane jig PUJ42146 	Height gauge PUJ42147-2 	JVC oil PU41761
Torque gauge ass'y PUJ48075-2 (Torque meter 600ATG Torque gauge head PUJ48016-2 	Back tension cassette gauge PUJ48076 	Cassette switch short jig PUJ43068 	Audio/Control head position tool PUJ47351-2 

Tabel 2-1 Jigs and tools

NOTE: See section 3.1 required test equipment and jigs regarding electrical adjustment.

2.1.3 Disassembly

A: External covers

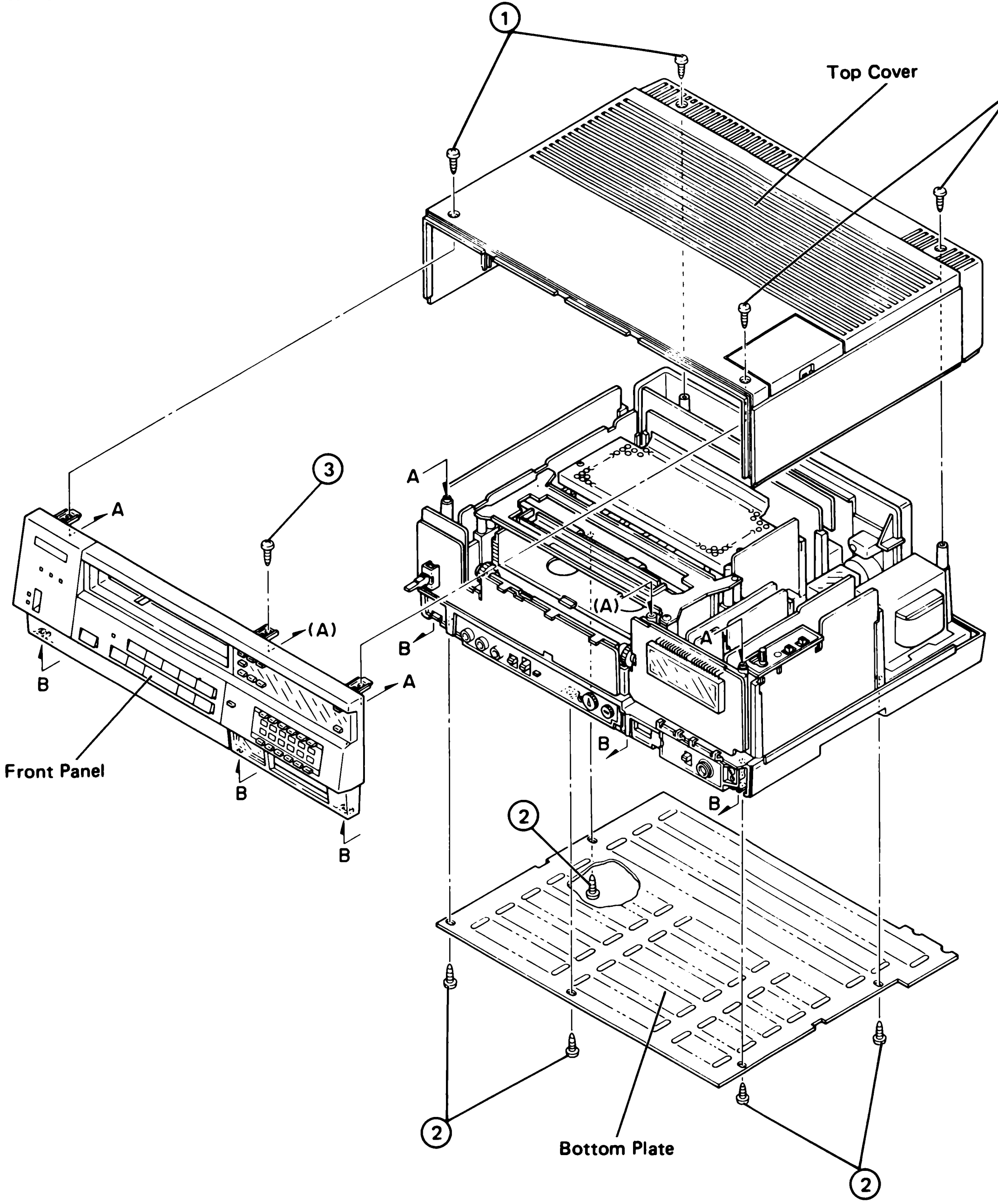


Fig. 2-1(a) External covers

1. Take out four screws ① and remove the top cover.
2. Take out five screws ② and remove the bottom plate.
3. To remove the front panel, take out one screw ③. As shown in Fig. 2-1 (a), the front panel is held by plastic post structures at two points A and three points B. Slightly raise the front panel to disengage points A, pull the panel outward by a small amount, then apply downward pressure to disengage points B. Afterwards, pull the panel gently outwards to remove.
4. To reassemble, reverse the above steps. Observe that points A and B are properly re-engaged.

B: Circuit board assemblies

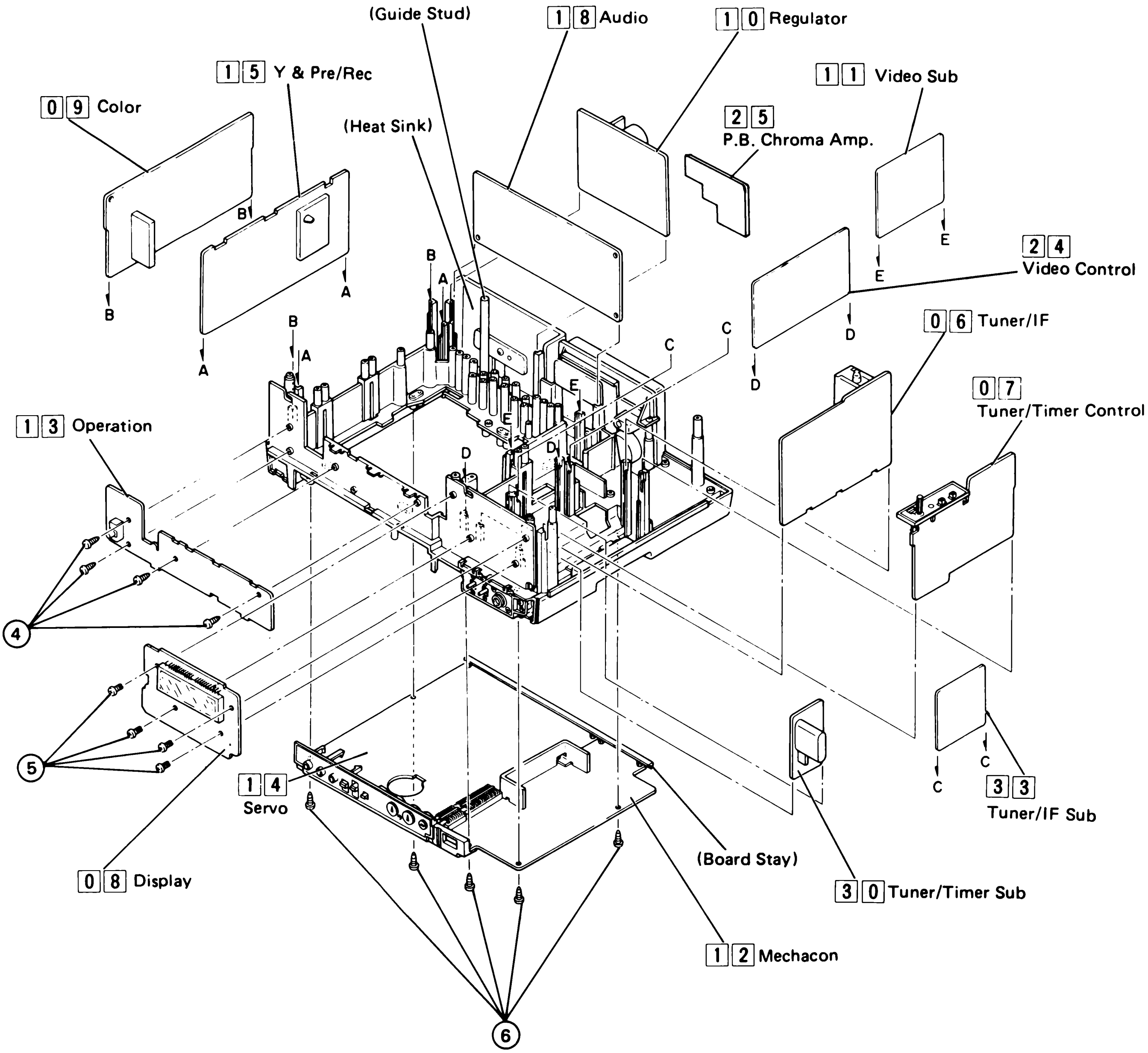

(Guide Stud)
18 Audio
10 Regulator
15 Y & Pre/Rec
11 Video Sub
09 Color
25 P.B. Chroma Amp.
(Heat Sink)
24 Video Control
06 Tuner/IF
07 Tuner/Timer Control
13 Operation
A
B
C
D
E
④
⑤
14 Servo
08 Display
(Board Stay)
33 Tuner/IF Sub
30 Tuner/Timer Sub
12 Mechacon
⑥

Fig. 2-1(b) Circuit boards

1. Operation board assembly
   Take out four screws ④ and remove the operation board assembly.
2. Display board assembly
   Take out four screws ⑤ and remove the display board assembly.
3. Servo and Mechacom board assemblies
   Take out five screws ⑥ and remove the board stay from the chassis assembly.
4. P.B. Chroma Amp. board assembly
   Pull the P.B. chroma Amp board upward from the main deck assembly board guide.
5. Other board assemblies
   Remove the Clolr, Y & Pre/Rec, Regulator, Audio, Video Control, Tuner/IF, Tuner/IF Sub, Tuner/Timer Control, Video Sub and Tuner/Timer sub board assemblies by pulling them upward from the cassis assembly board guides.
6. Heat sink
   The heat sink, with power transistor and servo power transistor boards, can be removed by pulling it upward from the guide stud of the chassis assembly.

2.1.4 Layout of main mechanical parts

A: Top view and parts identification

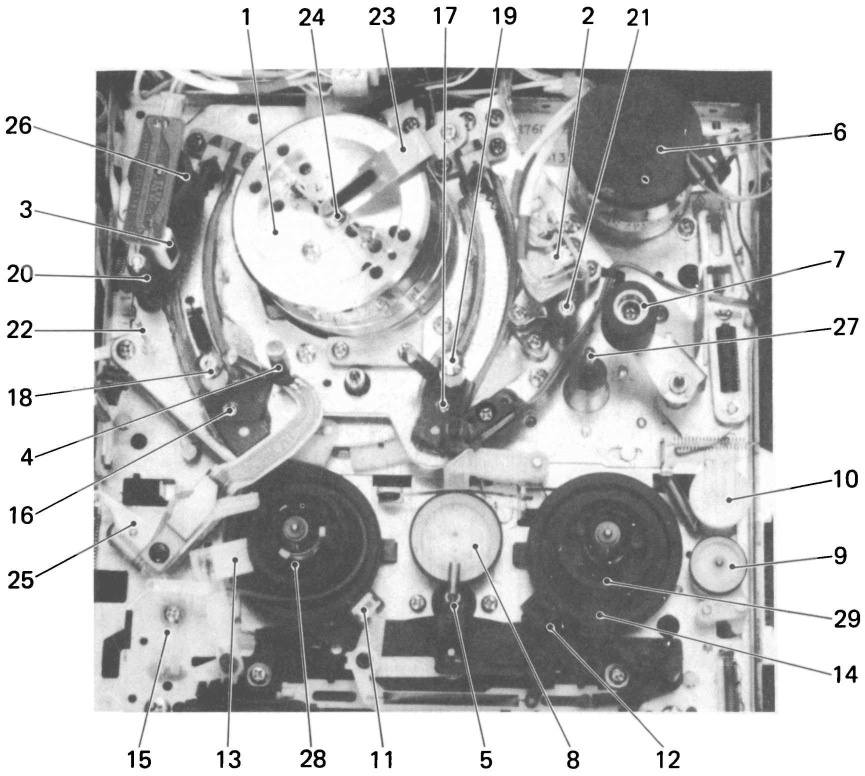


Fig. 2-2(a) Top view

Catego-ry	Symbol No.	Part Name	Part No.	Catego-ry	Symbol No.	Part Name	Part No.
A	1	Upper drum ass'y	PU31332L	E	16	Supply pole base ass'y	PQ40171A-1
	2	Audio/Control head ass'y	PU51903C		17	Take-up pole base ass'y	PQ40172A-1
	3	Full erase head	PU51263-2		18	Supply guide roller ass'y	PU48748B
	4	Cue head (Tension pole)	PU49654		19	Take-up guide roller ass'y	PU48748B
B	5	Reel motor ass'y	PU53577V		20	Supply guide pole	PU53826
					21	Take-up guide pole	PU53826
	6	Capstan motor ass'y	See tabel 2-2 (b) 51		22	Supply. guide pin	Included in sub deck ass'y
C	7	Pinch roller ass'y	PU51367A	F	23	Brush ass'y	PU48678A
	8	Reel idler ass'y	PU48967B		24	Commutator	PU49483
	9	Take-up idler ass'y	PU51402		25	Tension arm	PU52267
	10	Take-up clutch ass'y	PU53462A		26	Impedance roller ass'y	PU51292A
D	11	Supply main brake	PU50713		27	Capstan flywheel ass'y	See tabel 2-2 (b) 60
	12	Take-up main brake	PU50671		28	Supply reel disk ass'y	PU48907D
	13	Loading tension brake	PU51384		29	Take-up reel disk ass'y	PU48907E
	14	Take-up back tension brake	PU51524				
	15	Tension band ass'y	PU51390A				

A: Heads B: Motors C: Rubber parts D: Brakes and band

E: Poles, rollers and pin F: Others

Main brakes............ Not incl. brake shoes (PU50670).
Tension brakes........ Not incl. Pads (PUM30019-2).

Tabel 2-2(a) Top view main part list

B: Bottom view and parts identification

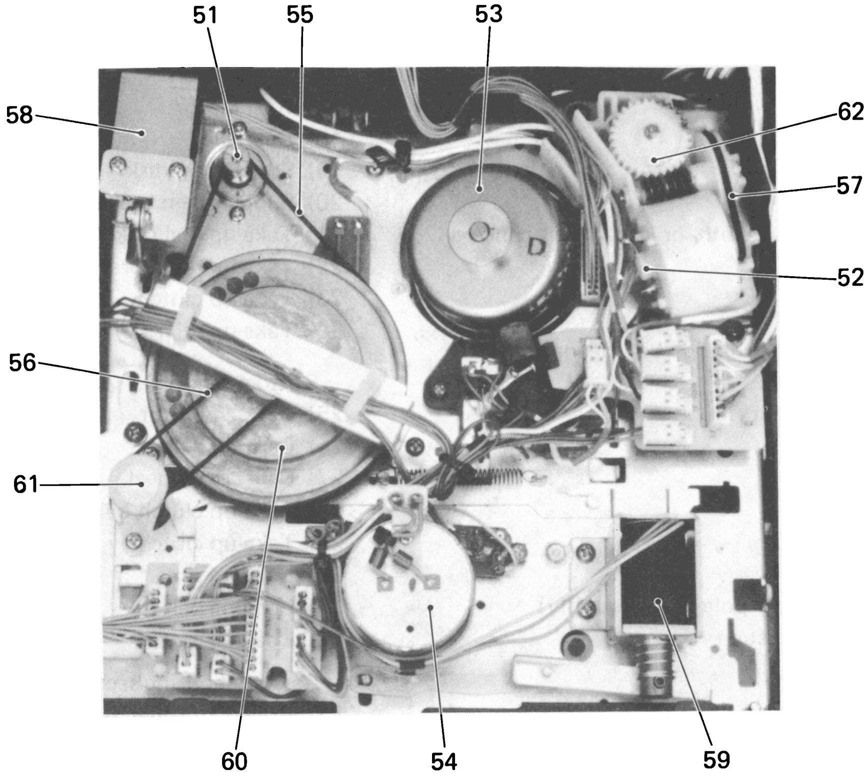


Fig. 2-2(b) Bottom view

Catego-ry	Symbol No.	Part Name	Part No.
G	51	Capstan motor ass'y	PU53994P
	52	Loading motor ass'y	PU52503A
	53	Lower drum ass'y	PUS36293F-7
	54	Reel motor ass'y	See tabel 2-2(a) 5
H	55	Capstan belt	PU49164
	56	Take-up clutch belt	PUM30003-1
	57	Loading belt	PU50350
I	58	Pinch roller solenoid	PU51900-1-2
	59	Brake solenoid	PU51873-1-2
J	60	Capstan flywheel ass'y	PU33265D
	61	Take-up clutch ass'y	See tabel 2-2(a) 10
	62	Loading gear ass'y	PU51859A-2
		(Incl. motor, belt, capacitor and screw for motor)	

G: Motors H: Rubber parts I: Solenoid J: Others

Table 2-2(b) Bottom view main parts list

2.2 PERIODIC MAINTENANCE

The following procedures are recommended for maintaining optimum performance and reliability of this video cassette recorder.

2.2.1 Cleaning

For cleaning, use a lint-free cloth or gauze dampened with alcohol.

A: Tape transport system

1. The following components should be cleaned after every 500 hours of use.
   1) Supply guide pin
   2) Cue head (Tension pole)
   3) Supply guide pole
   4) Full erase head
   5) Impedance roller
   6) Supply guide roller
   7) Supply slant pole (Supply pole base assembly)
   8) Video head and Drum system
   9) Commutator
   10) Brush
   11) Take-up slant pole (Take-up pole base assembly)
   12) Take-up guide roller
   13) Audio/Control head and Audio erase head
   14) Take-up guide pole
   15) Pinch roller
   16) Capstan
2. Since above parts come in direct contact with video tape, they tend to collect dust particles. If allowed to accumulate, dust may lead to damage to the video tape and above parts.
3. After cleaning with alcohol, allow the parts to dry thoroughly before using a cassette tape.

NOTE:
When cleaning the two video heads on the upper drum, do not clean them with a vertical stroke.
Use only a gentle back and forth motion in the direction of the tape path.
Use care since they are easily damaged.
When cleaning video heads, A/C head and erase heads, use a lint-free cloth dampened with alcohol.

B: Reel drive system

1. The following components should be cleaned after every 1,000 hours of use.

   – Upper section –
   17) Reel motor
   18) Reel idler
   19) Supply reel disk
   20) Supply main brake
   21) Take-up reel disk
   22) Take-up main brake
   23) Take-up clutch
   24) Take-up idler

   – Bottom section –
   25) Capstan motor
   26) Capstan belt
   27) Capstan flwheel
   28) Take-up clutch belt
   29) Take-up clutch
   30) Loading gear
   31) Loading belt
   32) Loading motor

   – Cassette housing section –
   33) Rollers of roller assembly
   34) Cassette belt
   35) Cassette motor
2. The above revolving parts are of rubber or come in direct contact with rubber parts.
   Rubber dust can accumulate and interfere with proper operation.
3. Avoid using excessive alcohol when cleaning rubber parts.

2.2.2 Lubrication

The following components should be lubricated with JVC oil after every 2,000 hours of use.

1) Shaft of the supply reel disk
2) Shaft of the take-up reel disk

After cleaning above shafts with alcohol, lubricate these shafts with one or two drops of JVC oil.
Do not over lubricate.

2.2.3 Service schedule for main components

The following chart lists the parts of the units which should receive periodic servicing at the recommended intervals.

Name	Periodic Service Schedule (operating hours)				
	1 000	2 000	3 000	4 000	5 000
Upper drum assembly	○	●	○	●	○
Brush assembly and commutator		●		●	
Cassette motor assembly			●		
Cassette belt		●		●	
Roller assembly (for cassette housing)		●		●	
Take-up clutch assembly		●		●	
Take-up clutch belt		●		●	
Take-up idler assembly		●		●	
Reel motor assembly		●		●	
Reel idler assembly		●		●	
Capstan motor assembly		●		●	
Capstan belt		●		●	
Loading motor			●		
Loading belt		●		●	
Audio/Control head assembly			●		
Tension band assembly		●		●	
Supply reel disk assembly			●		
Take-up reel disk assembly			●		
Loading tension brake pad		●		●	
Take-up back tension brake pad		●		●	
Pinch roller assembly			●		
Cue head					●
Full erase head					●

Table 2-3 Standard service periods

○ Check and replace if necessary.

● Replace.

NOTE:

Even if the unit is not used frequently, cleaning, lubrication and replacement of the belts should be undertaken every 2 years.

2.3 MAIN ASSEMBLY REPLACEMENTS

2.3.1 Cassette housing assembly, cassette motor assembly and cassette switch

A: Cassette housing assembly

1. Remove the top cover and front panel.
2. Take out four screws Ⓐ and disconnect the cap housing (see Fig. 2-3). Carefully lift the cassette housing upward to remove it. During reaassembly, use care that the record safety arm does not damage the leaf switch.

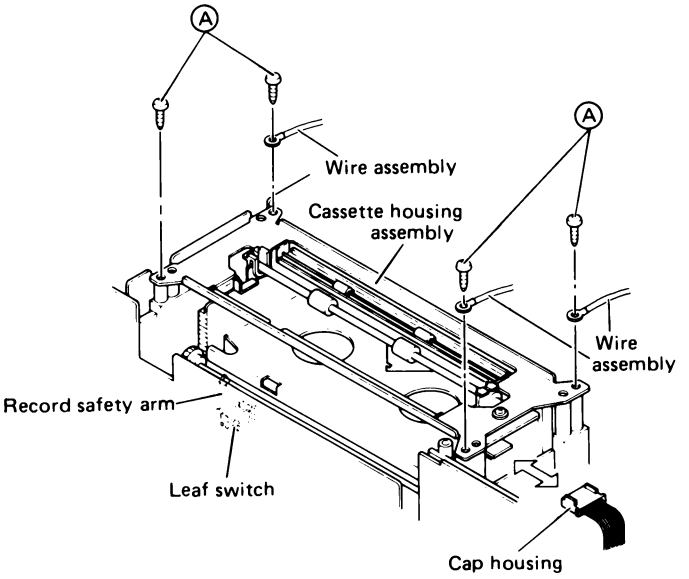

Ⓐ
Ⓐ
Wire assembly
Cassette housing assembly
Wire assembly
Record safety arm
Leaf switch
Cap housing

Fig. 2-3 Cassette housing removal

3. To reinstall the cassette housing, first connect the cap housing. Gently set the cassette housing into the main deck while using care that the record safety arm does not damage the leaf switch. Check that the housing is properly engaged at points A, B, C and D as indicated in Fig. 2-4.

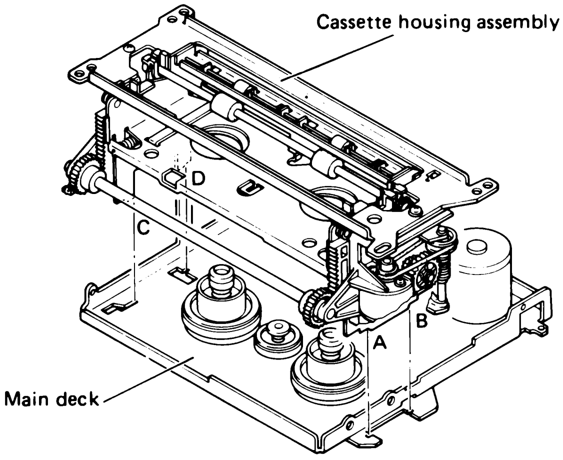

Cassette housing assembly
D
C
B
A
Main deck

Fig. 2-4 Cassette housing setting

4. Insert the four screws Ⓐ , shown in Fig. 2-3 (also reattach the two wire assemblies), but do not tighten the screws.
5. Shift the cassette housing so that points C and D (Fig. 2-4) are at their most rearward (toward the drum assembly) positions, then tighten the four screws Ⓐ.
6. Use a cassette tape and check for smooth operation of the cassette housing assembly. Also confirm operation of the record safety arm.

NOTE: The cassette switch is mounted on the cassette housing. For this reason, the set becomes inoperative when the cassette housing is removed (cap housing disconnected).

B: Cassette motor assembly

1. Unsolder the cassette motor wires.

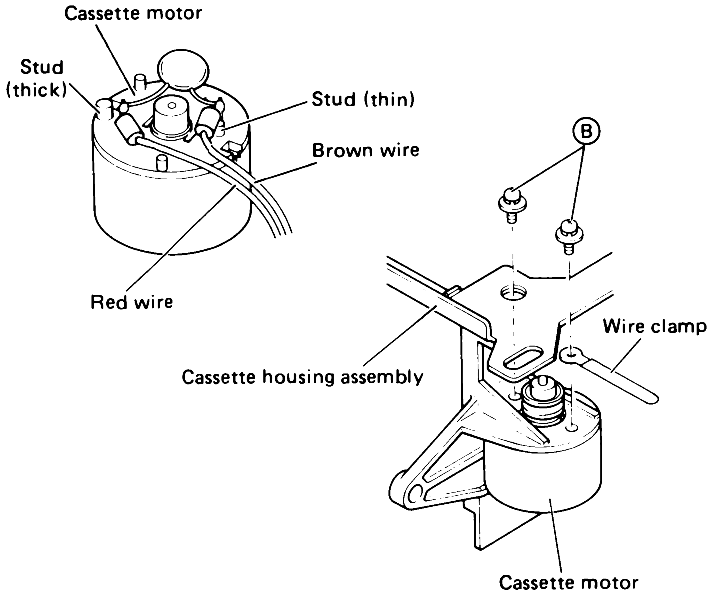

Cassette motor
Stud (thick)
Stud (thin)
Brown wire
Ⓑ
Red wire
Wire clamp
Cassette housing assembly
Cassette motor

Fig. 2-5 Cassette motor replacement

2. Disengage the belt from the motor pulley, take out two screws Ⓑ and remove the cassette motor. See Fig. 2-5.
3. Reinstall the cassette motor with the two screws Ⓑ, together with the wire clamp, then reengage the belt.
4. Solder the wire coming from connector 1 of the cap housing to the cassette motor terminal adjacent to the thicker diameter stud. This is the minus (–) terminal. Observe that wires do not contact rotating parts.
5. Use a cassette tape and check for smooth operation of the cassette housing assembly. Confirm operation of the record safety arm.

C: Cassette switch

1. Unsolder the cassette switch wires.

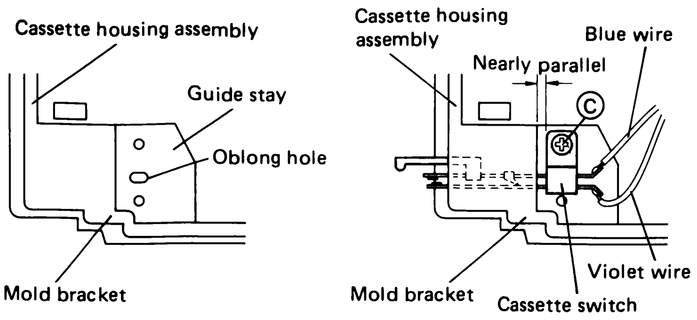
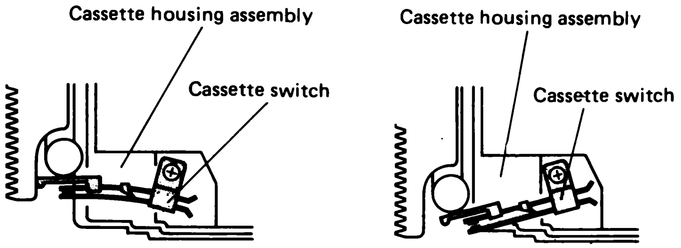

Cassette housing assembly
Guide stay
Oblong hole
Mold bracket
Cassette housing assembly
Blue wire
Nearly parallel
Ⓒ
Violet wire
Mold bracket
Cassette switch

Fig. 2-6 Cassette switch replacement

2. Take out one screw Ⓒ and remove the cassette switch toward the right. See Fig. 2-6.
3. When reinstalling the cassette switch, use care not to damage the contacts. Insert the cassette switch toward the left and engage the stud at the rear of the switch with the oblong hole of the guide stay. Position the switch so that is nearly parallel with the mold bracket, as shown in Fig. 2-6, then secure with screw Ⓒ.
4. Resolder the cassette switch wires.

NOTE:
When the cassette switch closes, short brake is applied to the cassette motor, stopping rotation. Consequently, the mounting position of the switch determines the cassette setting position. After the cassette housing has been installed at the correct position, perform the following checks and readjust the cassette switch position as required.

1) Supply power and insert a cassette. Observe the cassette lowering and setting operation. Check for the following symptoms.
2) Cassette position too high
In this case, the switch contacts are too high, as indicated in Fig. 2-7 (a). The switch closes (on state) before the cassette has been fully lowered. Test by gently pressing the cassette by hand to determine whether it can be lowered further.


Cassette housing assembly
Cassette switch
Cassette housing assembly
Cassette switch

(a) Too high

(b) Too low

Fig. 2-7 Cassette switch adjustment

3) Eject mode entered
After the cassette motor rotates, if the cassette switch does not close within about 7 seconds, the eject mode is automatically entered. This effect can be caused if the switch contacts are positioned too low, as shown in Fig. 2-7 (b). At this time, even though the cassette is fully lowered, the cassette switch contacts do not close.
4) Rebound effect
After reaching the bottom of travel, the cassette rebounds slightly upward. In this case, there is a slight delay between maximum lowering and cassette switch closing. Residual tension of the cassette belt then pulls the cassette slightly upward.
5) If any of the above effects is observed, adjust the cassette switch position to obtain precise timing between the end of cassette travel and cassette switch closing.
6) Use a cassette tape and check for smooth operation of the cassette housing assembly. Confirm functioning of the record safety arm.

2.3.2 Upper drum, brush assembly and commutator

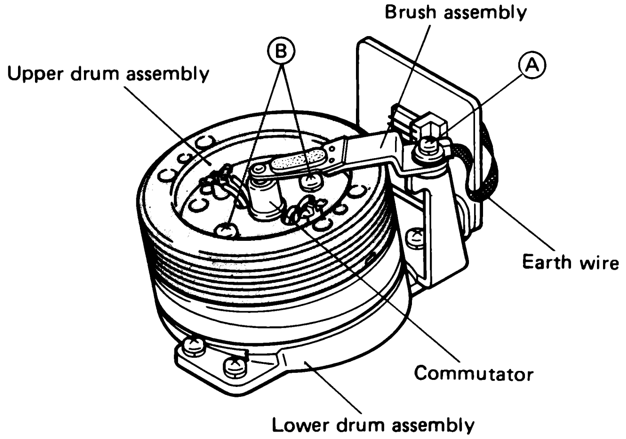

Brush assembly
Ⓑ
Upper drum assembly
Ⓐ
Earth wire
Commutator
Lower drum assembly

Fig. 2-8 Upper drum replacement

1. Take out screw Ⓐ , disconnect the earth wire and remove the brush assembly. See Fig. 2-8.
2. Remove the commutator from the drum motor shaft.

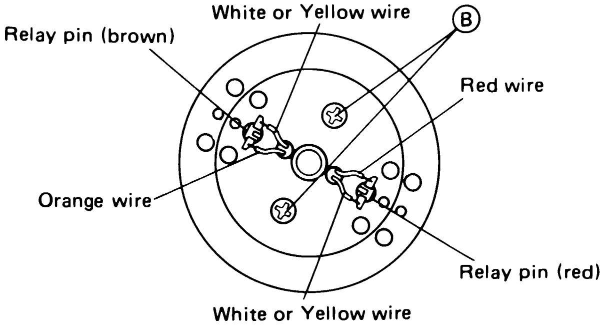

White or Yellow wire
Ⓑ
Relay pin (brown)
Red wire
Orange wire
Relay pin (red)
White or Yellow wire

Fig. 2-9 Upper drum wiring

3. Unsolder the four wires connecting the lower drum assembly from the relay pins of upper drum assembly (perform quickly to avoid damaging the wires) as shown in Fig. 2-9.
4. Take out two screws Ⓑ and remove the upper drum assembly in the upward direction.
5. Use alcohol to clean the lower face of the new upper drum assembly and the upper face of the lower drum assembly. When handling and installing the new upper drum, avoid directly touching the video heads and use care not to scratch the drum.
6. Reassemble by reversing the above steps. When resoldering, observe the correct channels (Orange: CH-1, red: CH-2) and avoid overheating the wires. Use screw Ⓐ to secure the brush assembly together with the earth wire to the video head board. Check that the brush assembly is positioned at the center of the commutator.
7. Perform the following checks and adjustments
    1) Video head switching position (see section 3.4.5).
    2) Tracking preset (see section 3.4.6).
    3) Overall checks and adjustment of the signal systems (see section 3.5).
    4) FM noise pulse width (see section 3.4.9).
    5) Control head phase (see section 2.5.8).

2.3.3 Take-up clutch and take-up idler assemblies

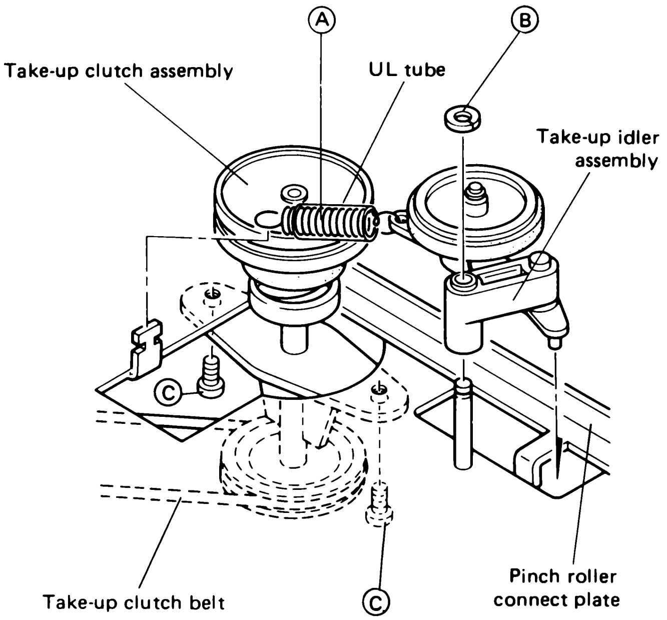


Fig. 2-10 Take-up clutch and take-up idler replacement

1. After unhooking the spring Ⓐ of the take-up idler from the deck, take off the slit washer Ⓑ to remove the take-up idler assembly in the upward direction and replace the take-up idler assembly.
2. From the bottom side, disengage the take-up clutch belt from the pulley of the take-up clutch assembly.
3. Take out two screws Ⓒ and replace the take-up clutch assembly.
4. Reassemble by reversing the above steps. At this time, clean the take-up clutch belt, take-up clutch and take-up idler.
5. Perform take-up torque check as follows.
6. Set for the Play mode without tape (refer to section 2.1.1-6).
7. Set the torque gauge on the take-up reel disk.

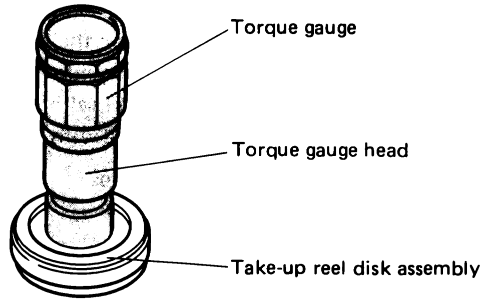


Fig. 2-11 Take up torque check

8. Relax the grip on the torque gauge so that the indicator needle and scale rotate at equal speeds, then read the indication. The correct value is between 60 and 100 gcm.
9. If not the correct value, confirm the conditions of the take-up idler spring and take-up clutch belt.

2.3.4 Reel motor and reel idler assemblies

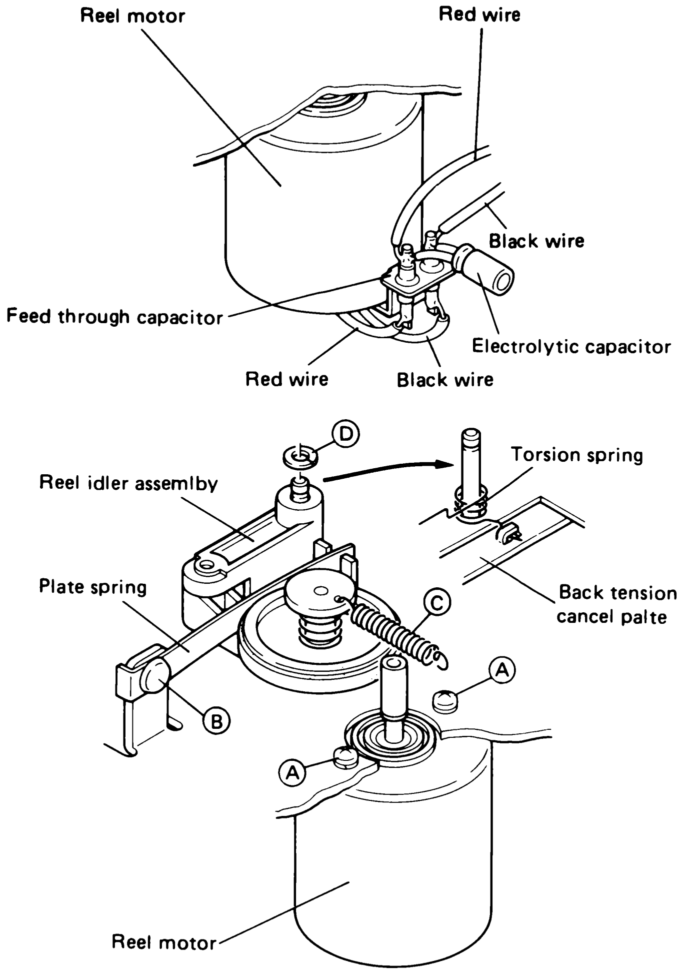

Reel motor
Red wire
Black wire
Feed through capacitor
Electrolytic capacitor
Red wire
Black wire
Ⓓ
Torsion spring
Reel idler assemlby
Plate spring
Ⓒ
Back tension cancel palte
Ⓐ
Ⓑ
Ⓐ
Reel motor

Fig. 2-12 Reel motor and reel idler replacement

1. Unsolder the wires from the feed through capacitor of the reel motor assembly from the bottom side as shown in Fig. 2-12.
2. Take out two screws Ⓐ from the top side and replace the reel motor assembly from the bottom side.
3. After removing the reel motor assembly, take out the plastic rivet Ⓑ and remove the plate spring.
4. After unhooking the spring Ⓒ of the reel idler assembly, take off the slit washer Ⓓ and replace the reel idler assembly.
   Use care regarding the washer and torsion spring when removing the reel idler assembly in the upward direction.
5. Reassemble by reversing the above steps.

2.3.5 Capstan motor assembly

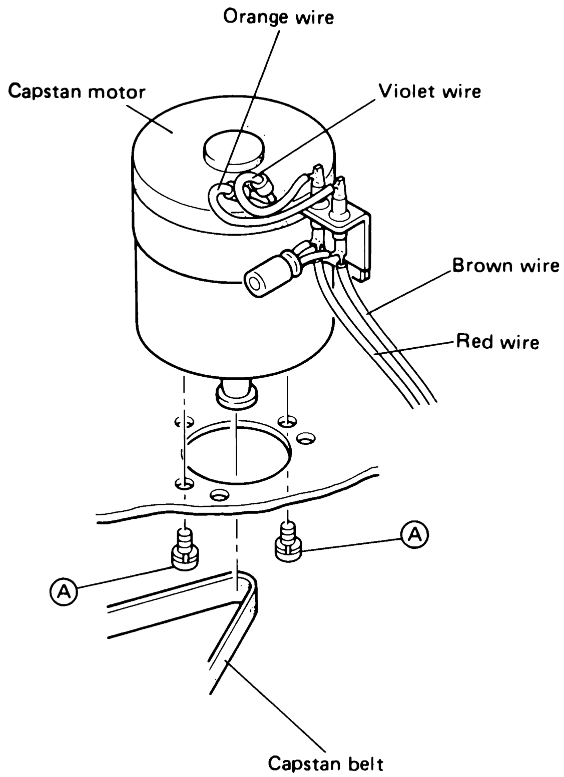

Orange wire
Capstan motor
Violet wire
Brown wire
Red wire
Ⓐ
Ⓐ
Capstan belt

Fig. 2-13 Capstan motor replacement

1. Unsolder the wires from the feed through capacitor as shown in Fig. 2-13.
2. From the bottom side, disengage the capstan belt from the capstan motor pulley.
3. Take out two screws Ⓐ and replace the capstan motor assembly.
4. Reassembly by reversing the above steps.
5. Perform the capstan discri. center check and adjustment (see section 3.4.4).

2.3.6 Loading motor assembly

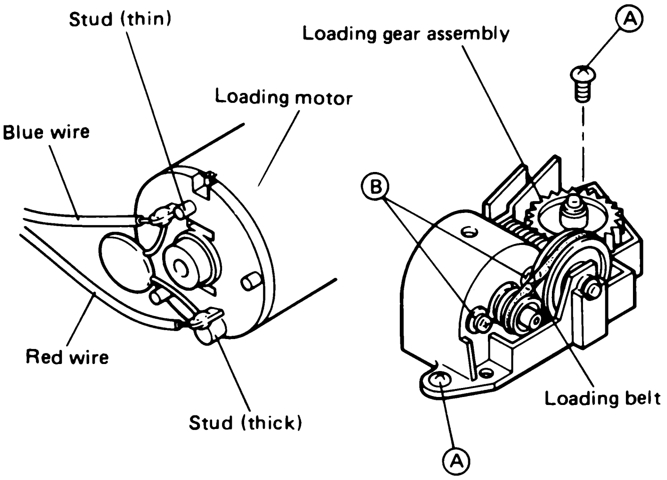

Stud (thin)
Loading gear assembly
Ⓐ
Loading motor
Blue wire
Ⓑ
Red wire
Stud (thick)
Loading belt
Ⓐ

Fig. 2-14 Loading motor replacement

1. Take out two screws Ⓐ and remove the loading gear assembly.
2. Unsolder the motor wires as shown in Fig. 2-14.
3. Disengage the loading belt from the motor pulley; take out two screws Ⓑ and replace the loading motor.
4. Reassembly by reversing the above steps. Turn the loading rings by hand to end of travel (loading end position) and install the loading gear assembly.
5. Turn the loading motor pulley by hand to move the loading ring slightly in the unloading direction. Check for equal spacing between the supply pole guide and supply pole base, and between the take-up pole guide and take-up pole base. If not equal, the loading gear ass'y mounting position is incorrect. Repeat the above step 4.
6. The minus (–) terminal of the loading motor is adjacent to the thicker diameter stud. Solder the wire coming from connector 92 of the junction board to this terminal. Observe that wires do not contact rotating parts.

2.3.7 Audio/Control head assembly

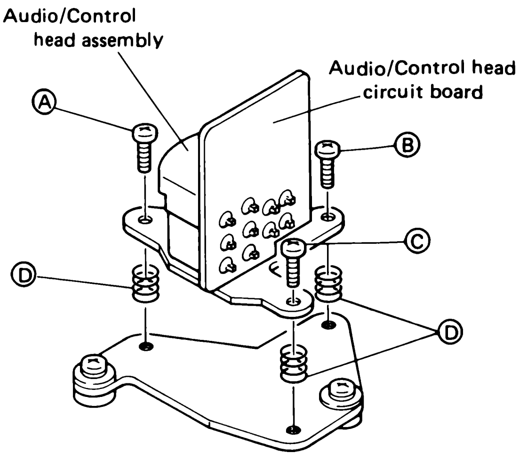

Audio/Control head assembly
Audio/Control head circuit board
Ⓐ
Ⓑ
Ⓒ
Ⓓ
Ⓓ

Fig. 2-15 A/C head replacement

1. Take out three screws Ⓐ , Ⓑ and Ⓒ to remove the A/C head assembly. Use care regarding the coil springs Ⓓ as shown in Fig. 2-15.
2. Unsolder the ten terminals coming from A/C head assembly and remove the A/C head circuit board as shown in Fig. 2-15.
3. Replace the A/C head assembly and reassemble by reversing the above steps.
4. Perform the following checks and adjustments.

A: Tape transport adjustment

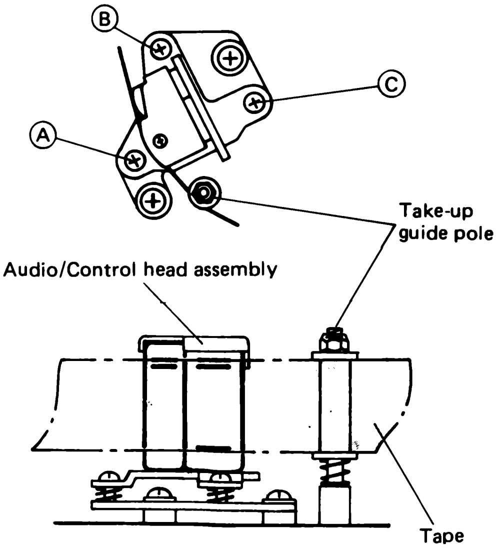

Ⓑ
Ⓒ
Ⓐ
Take-up guide pole
Audio/Control head assembly
Tape

Fig. 2-16 A/C head adjustment

1. Employ a cassette tape and set for Play mode.
2. Turn screw Ⓒ (Fig. 2-16) and adjust for smooth transport at the take-up guide pole. Do not adjust the height of the take-up guide pole itself.

B: Audio/Control head height and azimuth

- Incorrect audio/control head height can impair audio signal-to-noise ratio when playing back a pre-recorded tape.

1. Play alignment tape (6 kHz and stairstep signals) and measure the audio output level.
2. Turn screws Ⓐ, Ⓑ and Ⓒ in succession by small and equal increments at a time and adjust for amximum audio output level. With reference to screw Ⓐ , adjust azimuth with screw Ⓑ and screw Ⓒ so that small tape wrinkles are not produced at the guide pole, but at the same time, audio output becomes maximum and level fluctuations minimum.
   It is suggested to first turn screw Ⓐ by a small amount, then turn screws Ⓑ and Ⓒ by an equal amount and set for maximum output.

C: Final checks and adjustments

1. Perform the interchangeability adjustment (see section 2.5).
2. Perform the audio system adjustment (see section 3.6).

2.3.8 Reel disk, tension band and cue head

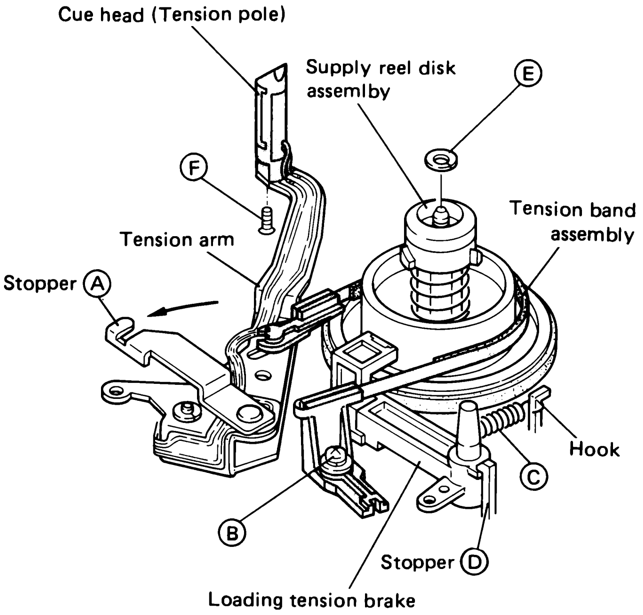


Fig. 2-17 Reel disk and tension band replacement

1. Slide stopper Ⓐ toward the left, then take out screw Ⓑ and remove the tension band assembly.
2. Unhook the spring Ⓒ, bend the stopper Ⓓ and remove the loading tension brake in the upward direction.
3. Take off the slit washer Ⓔ to replace the reel disk assembly. Use care regarding the washers when removing the reel disk assembly in the upward direction.
4. Reassemble by reversing the above steps. Apply a small amount of oil to the reel shaft.
5. To remove the cue head, unsolder the lead wires and take out screw Ⓕ. When replacing, use care regarding the mounting angle.
6. Perform the following checks and adjustments.

A: Reel disk height

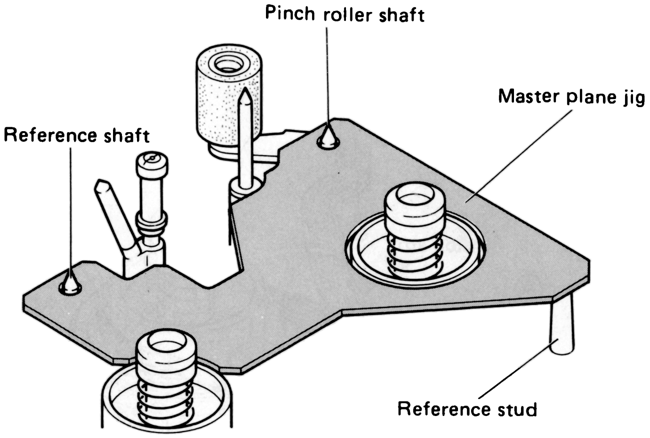

Pinch roller shaft
Master plane jig
Reference shaft
Reference stud

Fig. 2-18 Master plane jig setting

1. Set the master plane jig as shown in Fig. 2-18.

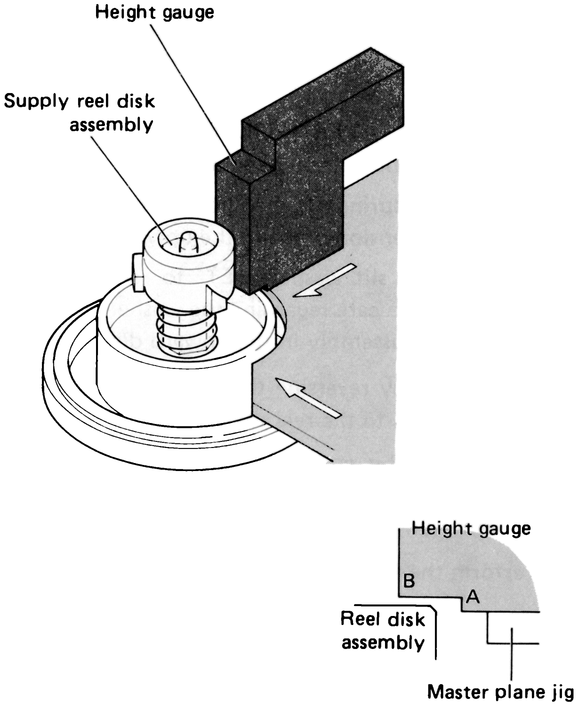

Height gauge
Supply reel disk assembly
Height gauge
B
A
Reel disk assembly
Master plane jig

Fig. 2-19 Reel disk height adjustment

2. **Use the height gauge to check the reel disk assembly height. Measure at two places 90° apart.**
3. **The correct height is between planes A and B as shown** in Fig. 2-19.

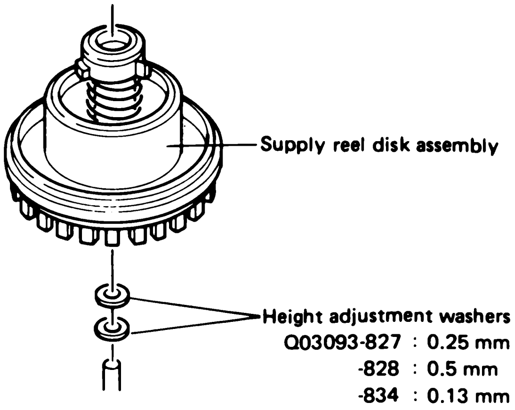

Supply reel disk assembly
Height adjustment washers
Q03093-827 : 0.25 mm
-828 : 0.5 mm
-834 : 0.13 mm

Fig. 2-20 Washers for height adjustment

4. **If it is necessary to adjust the height, add or subtract the required number of height adjustment washers as shown** in Fig. 2-20.
5. **After reassembling, confirm a small amount of mechanical play between reel disk and slit washer.**
6. **Height adjustment is not required for the take-up reel disk.**

B: Cue head mounting angle

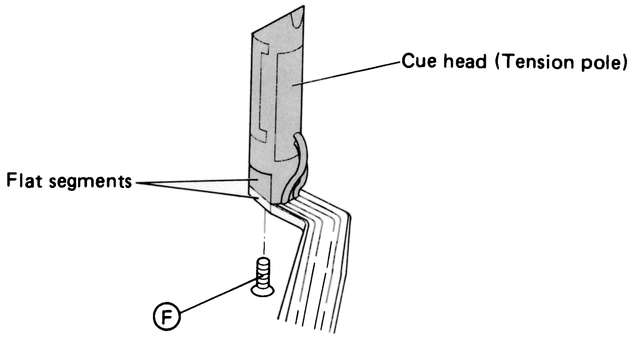

Cue head (Tension pole)
Flat segments
Ⓕ

Fig. 2-21 Cue head mounting angle

1. **Mount the cue head using screw Ⓕ, but do not tighten fully.**
2. **As shown in Fig. 2-21, align the flat segments of the cue head and tension arm, then tighten screw Ⓕ.**

C: Tension pole (cue head) position

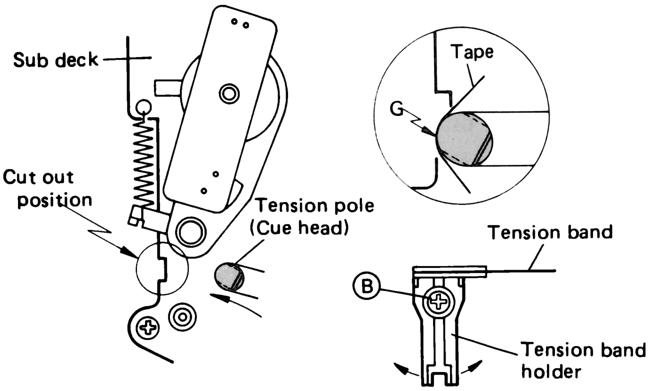

Sub deck
Cut out position
Tension pole (Cue head)
Tape
G
Tension band
Ⓑ
Tension band holder

Fig. 2-22 Tension pole (cue head) position adjustment

1. While the tape is running, check that point G of the cue head (tension pole) is positioned within the 0.5 mm range shown in Fig. 2-22.
2. If necessary, loosen screw Ⓑ and adjust the tension band holder to obtain the correct tension pole position.

   Note: If back tension is incorrect, check the tension pole position. Use the back tension cassette gauge and confirm a value of between 30 g to 40 g. If necessary, replace the back tension arm spring and re-adjust the tension pole position.

2.3.9 Pinch roller solenoid

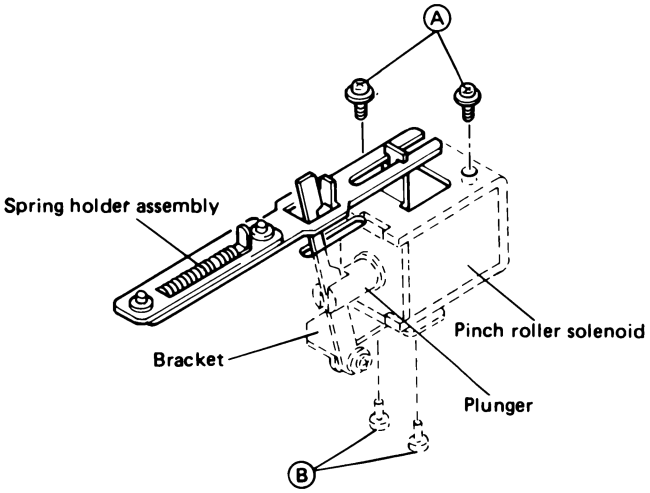

Ⓐ
Spring holder assembly
Bracket
Pinch roller solenoid
Plunger
Ⓑ

Fig. 2-23 Pinch roller solenoid replacement

1. Take out two screws Ⓐ and remove the pinch roller solenoid.
2. Take out two screws Ⓑ, remove the solenoid bracket and replace the pinch roller solenoid (ordinarily, it is not necessary to replace the plunger).
3. Reassemble by reversing the above steps, but do not tighten screws Ⓐ firmly at this time.
4. Without tape, supply power and set for the Play mode.

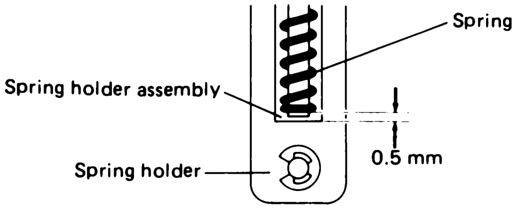

Spring
Spring holder assembly
Spring holder
0.5 mm

Fig. 2-24 Pinch roller solenoid adjustment

5. Adjust the solenoid mounting position for 0.5 mm space between the spring holder and spring as shown in Fig. 2-24. Then tighten the screws Ⓐ firmly. This step adjusts pinch roller pressure.

2.3.10 Capstan flywheel and capstan FG board

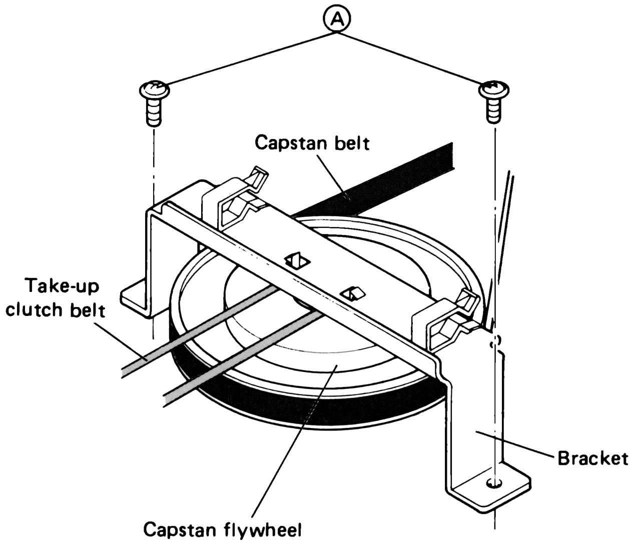

Ⓐ
Capstan belt
Take-up clutch belt
Bracket
Capstan flywheel

Fig. 2-25 Capstan flywheel replacement

1. Take out two screws Ⓐ and remove the bracket. See Fig. 2-25.
2. Disengage the take-up clutch and capstan belts, then gently remove the capstan flywheel in the upward direction. At this time, use care not to misplace the capstan oil seal and spacer attached to the capstan.

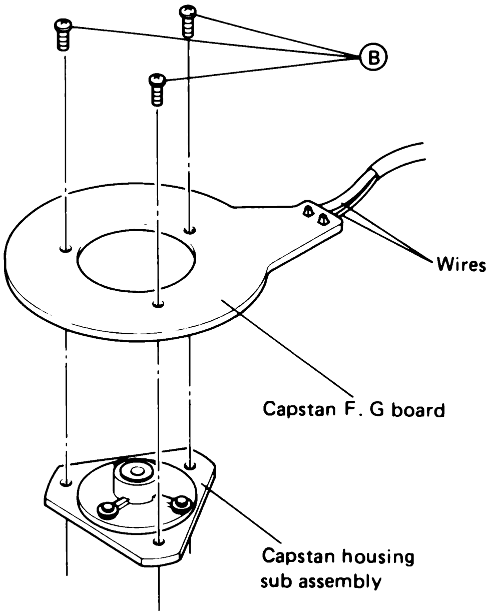


Fig. 2-26 Capstan F.G. board replacement

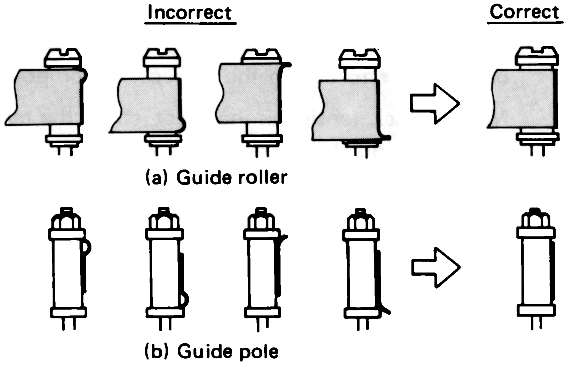
3. Take out three screws Ⓑ, indicated in Fig. 2-26, and remove the capstan FG board. Unsolder the lead wires.
4. Reassemble by reversing the above steps. After mounting the capstan flywheel, spacer and capstan oil seal, use alcohol to thoroughly clean the capstan.

2.4 TAPE TRANSPORT SYSTEM CHECKS AND ADJUSTMENT

The tape transport system has been precisely aligned at the factory and normally does not require readjustment. The following steps are therefore necessary only in cases of severe usage or when replacing parts affecting the tape transport system.

2.4.1 Tape transport check

1. Employ a 120-minute tape and check at tape beginning and ending portion according to the following steps.
2. Operate the machine between Play and Stop modes several times.
   During Loading and Unloading, observe the tape at the supply and take-up guide rollers and guide poles.
   Confirm absence of curling, wrinkling, etc. as shown in Fig. 2-27.



(a) Guide roller

(b) Guide pole

Fig. 2-27 Guide roller and guide pole

3. Observe the tape as it becomes wrapped around drum during loading and as it separates from the drum during unloading.

   Confirm absence of damage to the tape at points Ⓐ and Ⓑ as shown in Fig. 2-28 and absence of contact noise between head tips and tape edge.

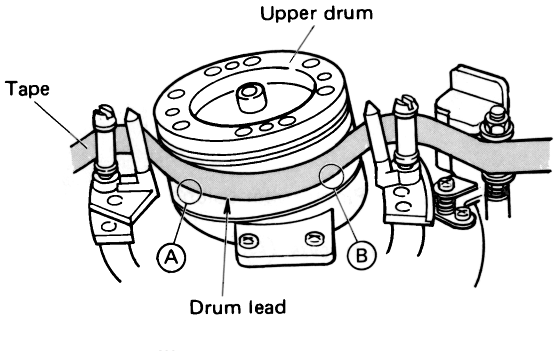


Fig. 2-28 Drum lead check-1

NOTES:

1. Slips upward : sound becomes produced by contact between tips of rotating heads and edge of tape.
2. Slips downward : tape curls or wrinkles from contacting lead face (sound may also be produced).

4. During Play mode, observe tape at the input and output portions (Ⓒ and Ⓓ in Fig. 2-29) of the head drum lead.
   Confirm that the tape slips neither upward nor downward with respect to the lead as shown in Fig. 2-30.

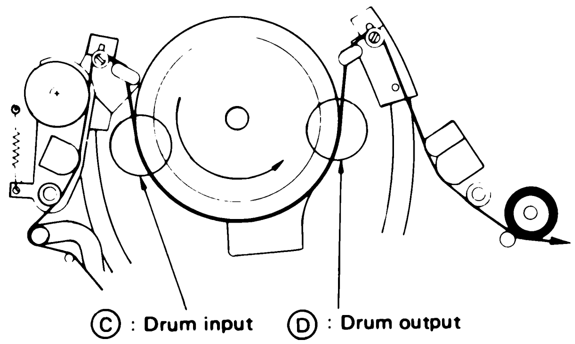


Fig. 2-29 Tape transport check

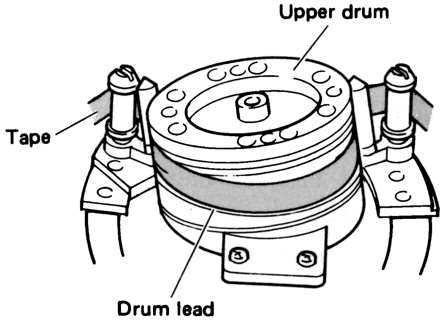


Fig. 2-30 Drum lead check - 2

5. During Play mode, observe the tape at the take-up and supply guide poles and guide rollers.
   Confirm absence of curling, wrinkling, etc. as shown in Fig. 2-27.
6. If defects are noted the above checks, perform the following adjustments.

2.4.2 Tope transport adjustments

Perform only if defects are noted during tape transport check (2.4.1).

A: Guide roller height adjustment

1. Slightly loosen setscrews of the supply and take-up guide rollers as shown in Fig. 2-31.
2. Use a cassette tape and set for Play mode.
3. With a slotted screwdriver, slightly turn the supply guide roller (do not turn more than 180° at a time) and adjust so that at the drum input, the tape travels smoothly in the drum lead without slipping upwards or downwards.
4. Similarly, adjust the take-up guide roller for the drum output.

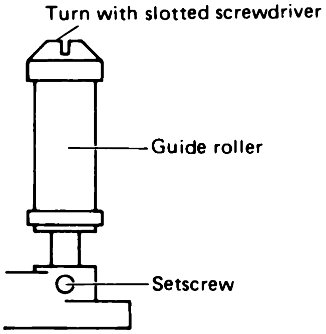


Fig. 2-31 Guide roller height adjustment

NOTES:

1. Loosen the setscrews only enough to allow the guide rollers to be turned.
   If excessively loose, tape motion may turn the rollers inadvertently.
2. Turn the rollers carefully to avoid damage to the tape.

B: Guide pole height adjustment

(a) Guide pole height check

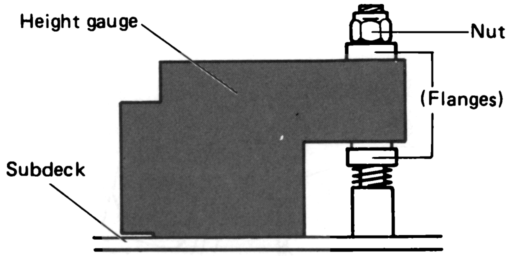


Fig. 2-32 Guide pole height adjustment

1. Set the height gauge on the subdeck as shown in Fig. 2-32.
2. For each guide pole, check the height of the lower face of the upper flange. If necessary, carefully adjust by turning the nut.
   After adjusting the height using the height gauge, turn the supply side nut 50° counter-clockwise and the take-up side nut 90° clockwise. This will provide the required slight difference in height between the supply and take-up guide poles.
3. If guide pole height has been adjusted, following checks and adjustments are required.

(b) Supply guide pole height adjustment

1. Use a cassette tape and set for Play mode.
2. Use a metric nutdriver to turn the supply guide pole to align the upper flange of the guide pole with the upper edge of the tape as shown by (b) of Fig. 2-27. However, this adjustment must be performed so that at the same time, the upper flange remains within ±0.5 mm of the height adjusting jig portion shown in Fig. 2-32.

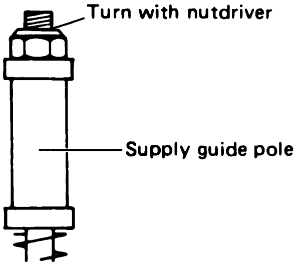


Fig. 2-33 Supply guide pole height adjustment

3. If there is a large discrepancy, check the height of the supply reel disk, tension pole and other mechanical components.

C: Audio/Control head adjustment

1. Employ a cassette tape and set for Play mode.
2. Turn audio/control head screw Ⓒ as shown in Fig. 2-34 and adjust for smooth transport at the take-up guide pole as shown by (b) of Fig. 2-27.

NOTE: Do not adjust the height of the take-up guide pole itself.

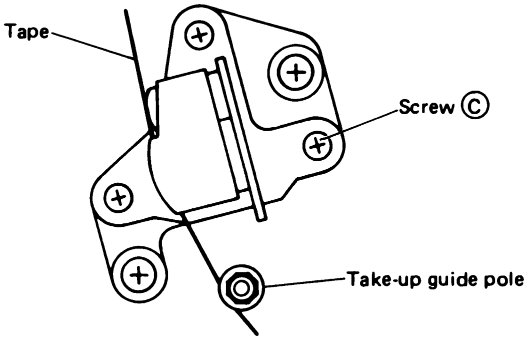


Fig. 2-34 Take-up guide pole

2.5 INTERCHANGEABILITY ADJUSTMENT

Before using alignment tape, employ a tape and confirm correct tape transport.

2.5.1 Preliminary checks

A: Check sequence 1

1. Connect oscilloscope to TP-106 of the Y & PRE/REC board. At this time, trigger the oscilloscope externally with the signal from TP-111 (DRUM F.F in) of the Y & PRE/REC board.
2. Play Stairstep portion of the alignment tape MH-2.
3. Turn the Tracking control and adjust for maximum FM output at TP-106.
   Set the Tracking control to AUTO (center click position) and confirm that nearly maximum output is obtained.

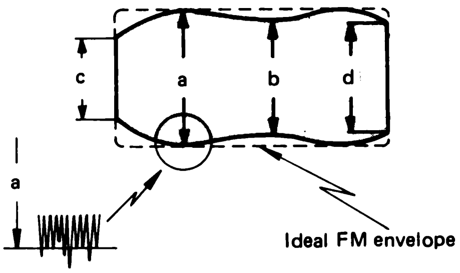


Fig. 2-35 FM waveform (max. output)

4. Refer to Fig. 2-35. Read the level of portion (a) of the waveform. If the waveform is serrated at point (a), read the value at the most uniform serrations as shown at left in Fig. 2-35.
5. Read the maximum FM level (a) and minimum FM level (b), and confirm that:

$$\frac{b}{a} \geqq 0.7 \text{ or } 20\log\frac{b}{a} \geqq -3\text{ dB}$$

6. Read the values at points (c) and (d) [drum input and output] and confirm that:

$$\frac{c}{a} \geqq 0.5 \text{ and } \frac{d}{a} \geqq 0.5 \ (\geqq -6\text{ dB})$$

NOTES:

1. Read minimum levels for (b), (c) and (d).
2. If above checks yield normal results, proceed to section 2.5.1 -B.
3. If defects are noted, perform adjustments of section 2.5.2.

B: Check sequence 2

1. Observe the FM waveform as in the previous section (2.5.1 - A) and turn the Tracking control.
   The waveform variation should be nearly parallel as shown in Fig. 2-36.

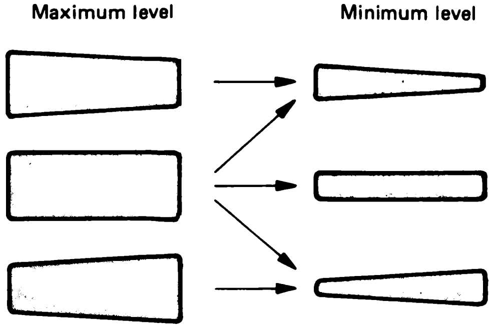


Fig. 2-36 Normal waveform examples

2. If the waveform varies as shown in Fig. 2-37, adjustment becomes required.

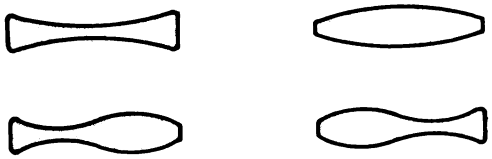


Fig. 2-37 Incorrect waveform examples

2.5.2 Preliminary adjustments

1. Loosen the setscrews of the supply guide roller and take-up guide roller.
   If the guide rollers turn freely, slightly tighten the setscrews.
2. Connect oscilloscope to TP-106 of the Y & PRE/REC board. Trigger the oscilloscope externally with the signal from TP-111 (DRUM F.F in) of the Y & PRE/REC board.
3. Play the alignment tape (stairstep signal) MH-2.

A: Drum input

1. Observe oscilloscope display and adjust the Tracking control for maximum FM output.
2. Refer to Fig. 2-38. Examples of incorrect waveforms are shown by A.
   Use a slotted screwdriver to adjust the supply guide roller so that the rising portion (drum input portion) of the waveform becomes flat as shown by B.

   NOTES:
   1. If the guide roller turns freely, tighten the setscrew slightly.
   2. Be sure to adjust the guide roller only by small amounts at a time in order to avoid damaging the alignment tape.

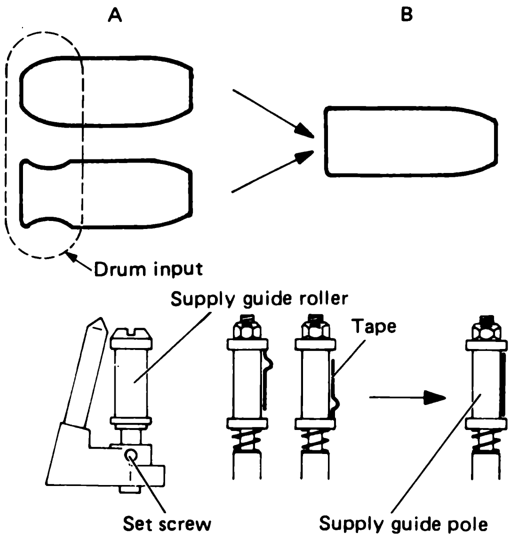


Fig. 2-38 Drum input adjustment

   In addition to observing the waveform, confirm absence of tape slippage or curling at the drum lead and guide poles.
3. At the supply guide pole, if the tape separates from the guide or wrinkling occurs, adjust the guide pole height.

B: Drum output

1. In the same manner as for the drum input, turn the take-up guide roller to adjust the falling portion (drum output portion) of the FM waveform.
   Incorrect examples are shown by Ⓒ in Fig. 2-39, while Ⓓ indicates the correct adjustment.
2. If the tape separates from the guide or wrinkling occurs at the take-up guide pole, adjust by turning screw Ⓒ of the audio/control head as shown in Fig. 2-39.

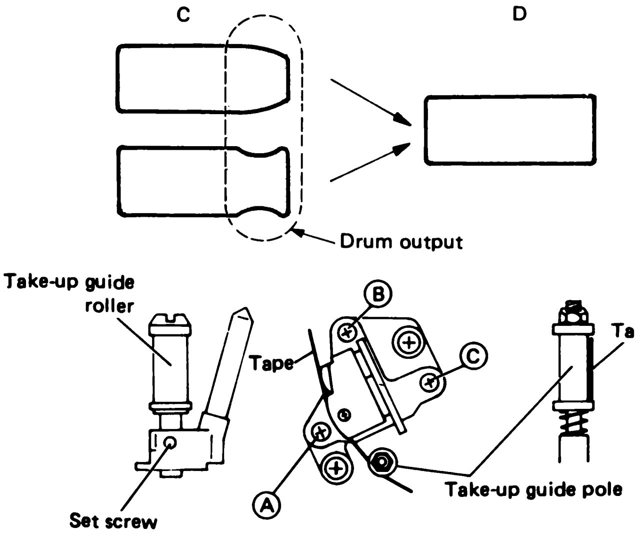


Fig. 2-39 Drum output adjustment

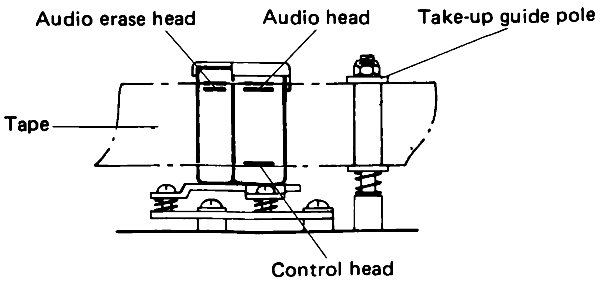


Fig. 2-40 Audio/Control head height

3. Carefully and evenly adjust screws Ⓐ, Ⓑ and Ⓒ to align the audio/control head height with the tape as shown in Fig. 2-40.

NOTES:

1. Fine adjustment is not required at this time. It is sufficient that the tape is engaged with the guide pole and servo operates stably (control signal picked up).
2. If the tape separates from the take-up guide pole or wrinkling occurs, screw Ⓒ (Fig. 2-39) has been turned excessively with respect to screws Ⓐ and Ⓑ, causing the audio/control head to incline forward or rearward. Use care to adjust screws Ⓐ, Ⓑ and Ⓒ evenly and observe that small wrinkles are not produced at the take-up guide pole.
3. Do not disturb the take-up guide pole.

2.5.3 Interchangeability fine adjustment

1. Connect oscilloscope to TP-106 of the Y & PRE/REC board. Play stairstep segment of the alignment tape MH-2. Observe the FM waveform and adjust the Tracking control for minimum FM output level.

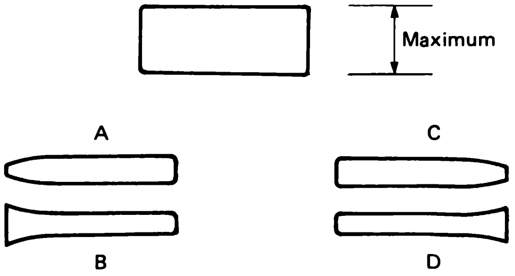


Fig. 2-41 Minimum FM output (incorrect examples)

2. If the waveform becomes as shown by A or B of Fig. 4-41, carefully adjust the supply guide roller height so that the waveform becomes as shown by E, F or G of Fig. 2-42.
At this time, if the waveform fluctuates, adjust to the point of minimum fluctuation.

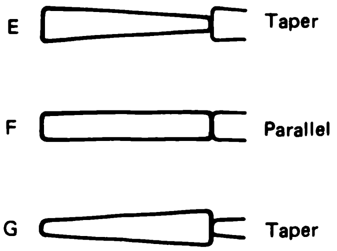


Fig. 2-42 Minimum FM output (correct examples)

3. If the FM waveform appears as shown by C or D in Fig. 2-41. carefully adjust the take-up guide roller height to obtain a waveform such as shown by E, F or G of Fig. 2-42.
At this time, if the waveform fluctuates, adjust to the point minimum fluctuation.
4. Vary the Tracking control from maximum to minimum FM output.
Perform fine adjustment of supply and take-up guide rollers so that waveform variation becomes as shown by E, F or G of Fig. 2-42.

2.5.4 Audio/Control head height, azimuth and inclination

See section 2.3.7-B Audio/Control head height and azimuth.

2.5.5 Setscrew tightening

1. Check for maximum FM output waveform, maximum audio out and absence of tape wrinkling or other transport irregularities, then secure the guide rollers.
Perform in Stop mode.
2. Since the guide rollers are easily moved, use care when securing.
3. After tightening the setscrews, again perform interchangeability final check.

2.5.6 Interchangeability final check

Confirm section 2.5.1 Preliminary checks.

2.5.7 Servo circuit adjustment

1. Video head switching position (see section 3.4.5).
2. Tracking preset (see section 3.4.6).

2.5.8 Control head phase adjustment

1. Connect oscilloscope to TP-106 of the Y & PRE/REC board. Trigger the oscilloscope externally with the signal from TP-111 (DRUM F.F in) of the Y & PRE/REC board.
2. Play stairstep portion of the alignment tape MH-2 and observe the oscilloscope display.
3. Set the Tracking control to AUTO (center click position).

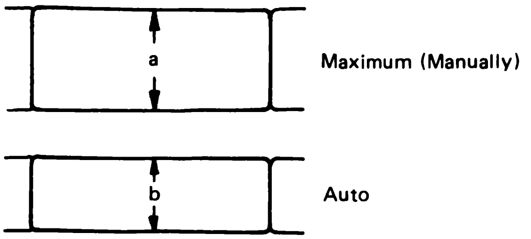


Fig. 2-43 FM output level

4. Confirm that the level difference between this setting and the maximum level obtained manually is:

$$-20 \log \frac{b}{a} \leqq 1\text{ dB or } \frac{b}{a} \geqq 0.9$$

5. If necessary, adjust as follows.
6. Set the Tracking control to AUTO and play stairstep segment of the alignment tape MH-2.
7. Loosen two screws Ⓓ and Ⓔ and slide the A/C head assembly fully in the direction to the take-up guide pole.

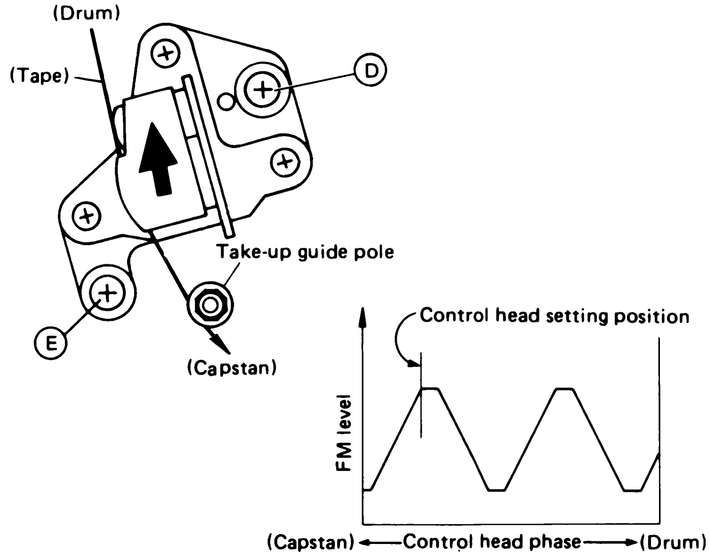

(Drum)
(Tape)
D
Take-up guide pole
E
(Capstan)
Control head setting position
FM level
(Capstan) ← Control head phase → (Drum)

Fig. 2-44 Control head phase adjustment

8. Slightly tighten the two screws and play stairstep segment of the alignment tape MH-2.
9. Set the audio/control head position tool (PUJ47351-2) over the screw Ⓓ and insert the pin of the tool into the hole at the side of the screw.
10. Slowly turn the tool and slide the A/C head assembly in the direction of the arrow as shown in Fig. 2-44.
11. Set the A/C head assembly to the position where first maximum FM level is obtained. Tighten two screws Ⓓ and Ⓔ.

2.5.9 Final checks (recording and playback)

1. Use a blank tape and perform recording and playback. Confirm FM waveform and specifications equivalent to those during playback of alignment tape (stairstep signal). See section 2.5.1.
2. Perform checks and adjustments of the audio recording and playback levels. See section 3.6 Audio circuit.
3. Check other signal systems by referring to section 3 electronic adjustment.

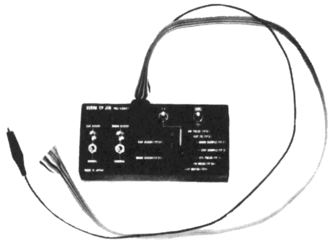
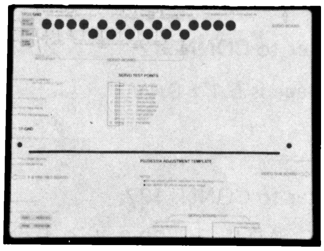
SECTION 3
ELECTRICAL ADJUSTMENTS

3.1 PREPARATION

Electrical adjustments are required after replacing circuit components and certain mechanical parts. It is important to perform these adjustments only after all repairs and replacements have been completed. Also, do not attempt these adjustments unless the proper equipment is available.

Required test equipment and jigs

- Digital voltmeter : High sensitivity
- Oscilloscope : Wide-band, Dual-trace
- Signal generator : PAL-color bar and stairstep, SECAM-color bar NTSC-color bar
- Frequency counter : High sensitivity, High impedance
- Regulated DC power supply : 0 – 30 V
- Audio generator
- TV signal generator : With color bar and stairstep signal outputs

• JVC Alignment Tape MH-2 (PAL) and MH-5 (NTSC /SECAM) 	• Servo TP jig PUJ43067 	• Adjustment Template PUJ36331G 	• Long shafted driver PUJ43620

NOTES: Be sure to check for smooth and proper tape transport before using the alignment tape.

IMPORTANT:
Even with the Sub-power switch off, DC voltage is supplied to the circuits. Therefore, set the rear panel MAINS POWER switch to off before performing service or replacing parts.

3.2 REGULATOR CIRCUIT

Unless otherwise indicated, all test points and adjustments are located on the REGULATOR board.

3.2.1 Regulated all 12V DC

1. Connect a digital voltmeter to TP2 (ALL 12V OUT) and set for the STOP (E-E) mode.
2. Adjust R15 (12V ADJ) for 12.0 ± 0.05 V DC.

3.2.2 Regulated 12V DC for CAMERA connector

1. Set the REC SELECT switch to CAMERA mode.
2. Connect a digital voltmeter to CONN. 32 (12V OUT) and set for the STOP (E-E) mode.
3. Confirm that the DC voltage is 13.0 ± 1.0 V.

3.2.3 Drum 12V DC

1. Connect a digital voltmeter to CONN. 84 (DRUM 12V OUT) and set for the STOP (E-E) mode.
2. Confirm that the DC voltage is 13.0 ± 1.0V.

3.2.4 Unregulated 22V DC

1. Connect a digital voltmeter to TP3 (UNREG 22V OUT) and set for the STOP (E-E) mode.
2. Confirm that the DC voltage is 23.0 ± 3.0V.

3.2.5 Switched 12V DC

1. Connect a digital voltmeter to CONN. 83 (SW 12V OUT) and set for the STOP (E-E) mode.
2. Confirm that the DC voltage is 12.0 ± 0.2 V.

3.3 TUNER/TIMER SUB CIRCUIT

Unless otherwise indicated, all test points and adjustments are located on the T/T (Tuner/Timer) SUB board.

Set for the STOP (E-E) mode.

3.3.1 3V AC

1. Connect a digital voltmeter between CONN. 122 and 123.
2. Confirm that the AC voltage is 3.0 ± 0.3 V.

3.3.2 −24V DC

1. Connect a digital voltmeter to CONN. 124.
2. Confirm that the DC voltage is −24 ± 1 V.

3.3.3 44V AC

1. Connect a digital voltmeter to CONN. 125.
2. Confirm that the AC voltage is 44 ± 6 V.

3.3.4 Back-up 5 V

1. Connect a digital voltmeter to CONN. 126.
2. Confirm that the DC voltage is 5.1 ± 0.4V.

3.3.5 30V REG.

1. Connect a digital voltmeter to CONN. 127.
2. Adjust R298 (30V REG ADJ) for 30.6 ± 0.1V DC.

3.4 SERVO CIRCUIT

NOTES:

1. Use the SERVO TP JIG for checkes and adjustments of the servo circuit.
2. Servo circuit test points we mainly formed by the 10 pin socket on the upper surface of the set (near the upper drum). Therefore connect the 10 pin plug of the SERVO TP JIG to this socket and the earth plug of the jig to the sub chassis earth terminal as indicated in Fig. 3-1.
3. Be sure to set the rear panel MAINS POWER switch to OFF before connecting the SERVO TP JIG.
4. Adjustments are performed by inserting an insulated alignment tool into the guide tubes located on the chassis.
5. Where not otherwise noted, test points and variable resistors are located on the SERVO board.

IMPORTANT:

Check that the Sub-power switch is on before measuring voltages at IC3 and IC12. These devices can be damaged if measurement is performed with power off.

3.4.1 Preparation

A. SERVO TP JIG

1. Engage the 10 pin plug of the jig with the 10 pin socket of the set. Connect the earth plug of the jig to the sub chassis earth terminal as indicated in Fig. 3-1.
2. Connect the oscilloscope probe to the TP and GND terminals of the jig. By using the selector switch, 9 waveforms can be observed.
3. When not otherwise noted, set the CAP. DISCRI and DRUM DISCRI switches to the NORMAL positions.
4. With either the CAP. DISCRI or DRUM DISCRI switch in the NORMAL position, LED lighting according to mode becomes as shown in Table 3-1.

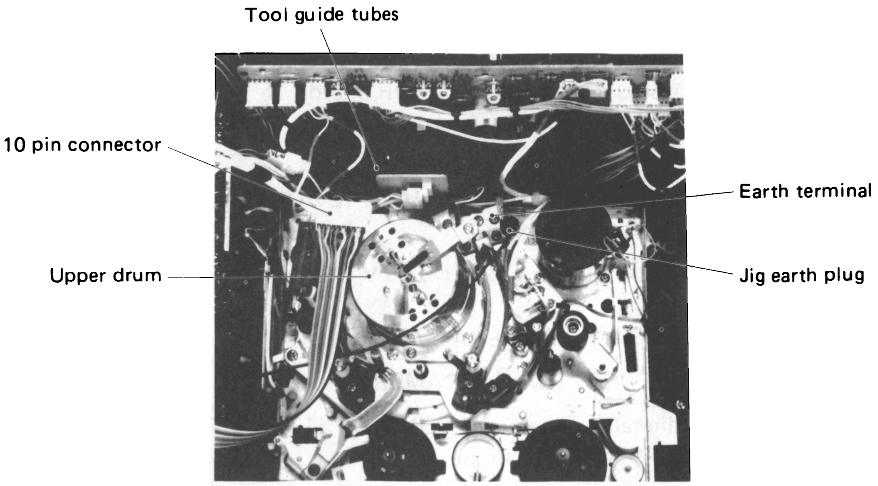


Fig. 3-1 Servo test poins and tool guide tubes

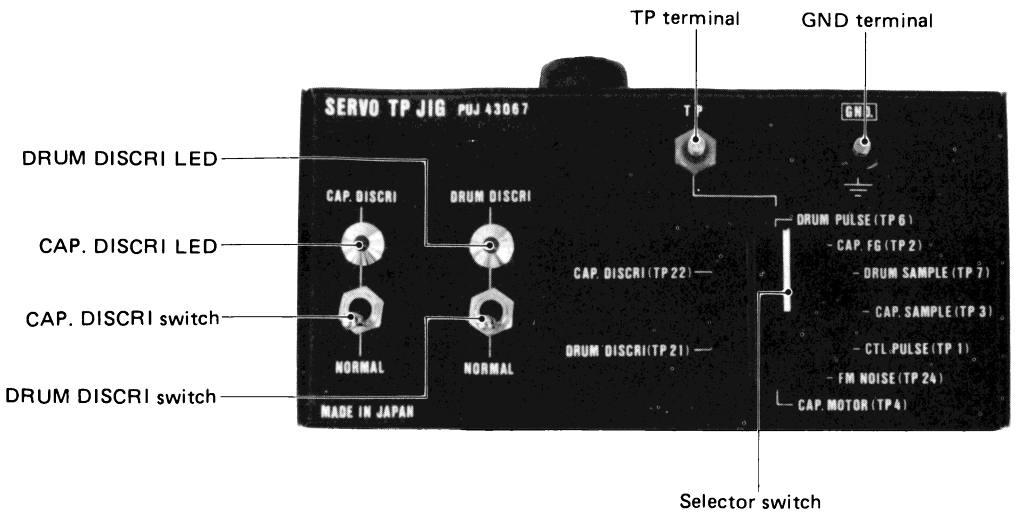

TP terminal
GND terminal
DRUM DISCRI LED
CAP. DISCRI LED
CAP. DISCRI switch
DRUM DISCRI switch
Selector switch
SERVO TP JIG PUJ 43067
CAP. DISCRI
DRUM DISCRI
NORMAL
NORMAL
MADE IN JAPAN
TP
GND
CAP. DISCRI (TP 22)
DRUM DISCRI (TP 21)
DRUM PULSE (TP 6)
CAP. FG (TP 2)
DRUM SAMPLE (TP 7)
CAP. SAMPLE (TP 3)
CTL PULSE (TP 1)
FM NOISE (TP 24)
CAP. MOTOR (TP 4)

Fig. 3-2 SERVO TP JIG

MODE	LED States	
	CAP DISCRI	DRUM DISCRI
Stop (E-E)	Lights	Lights dimly
Play or REC (Loading complete)	Extinguishes	Extinguishes
Search REW or FF	Lights	Lights dimly
Discriminator mode	Lights	Lights

Table 3-1 LED Lighting

B: Adjustment Template

1. The adjustment template is available for convenience in identifying the variable resistors when adjusting the Servo board.
2. The template is used for the top side of the set.
3. Use 2 screws Ⓐ of the cassette housing to hold the template in place as shown in Fig. 3-3.
4. When adjusting the Servo circuit, employ a long shafted screwdriver. Insert it into the appropriate guide tube and carefully turn the control.

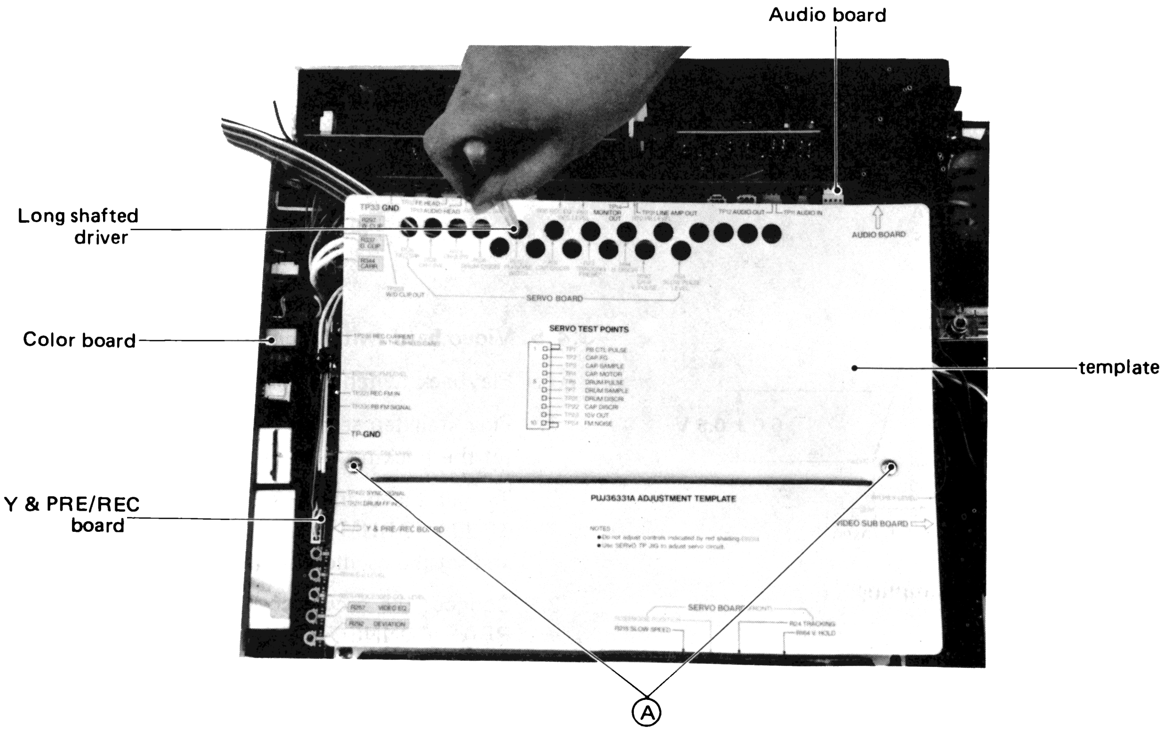

Audio board
Long shafted driver
Color board
Y & PRE/REC board
template
Ⓐ
AUDIO BOARD
SERVO BOARD
SERVO TEST POINTS
TP GND
PUJ36331A ADJUSTMENT TEMPLATE
VIDEO SUB BOARD

Fig. 3-3 Adjustment template

3.4.2 Drum pulse level

1. Play color bar segment of JVC MH-2 alignment tape.
2. Set the selector switch of the jig to DRUM PULSE (TP-6) position.
3. Adjust R56 that (a) and (b) become 0.75 ± 0.2 V.

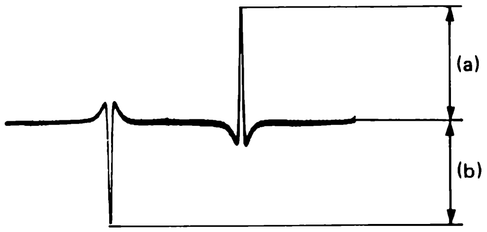


Fig. 3-4 Drum pick up pulse

3.4.3 Drum discriminator center

1. Supply a NTSC color bar signal and set for the recording mode.
2. Set the selector switch of the jig to DRUM SAMPLE (TP-7) and the DRUM DISCRI switch to ON (DRUM DISCRI LED lights).
3. Adjust R102 to stabilize the sampling pulse with respect to the trapezoid. At this time, a slow drift toward the left at the rate of less than 33 msec in 10 seconds is acceptable.
4. Set the jig DRUM DISCRI switch to NORMAL and confirm a stable sampling pulse positioned at the center of the ramp.
5. Supply a PAL color bar signal and set the recording mode.
6. Perform the step 2.
7. Adjust R100 to stabilize the sampling pulse with respect to the trapezoid. At this time a slow drift toward the left at the rate of less than 40 msec in 10 seconds is acceptable.
8. Perform the step 4.

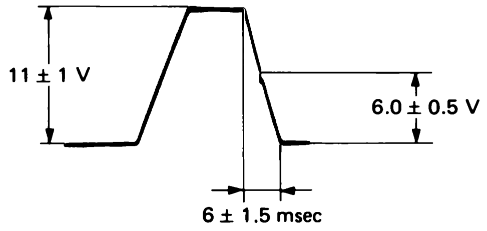
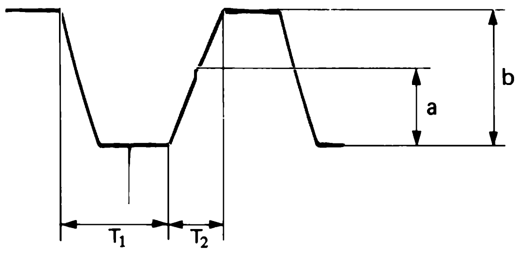


Fig. 3-5 Drum sampling

3.4.4 Capstan discriminator center

1. Supply a PAL color bar signal and set for the recording mode.
2. Set the jig selecter switch to CAP. SAMPLE (TP-3) and the CAP. DISCRI switch to ON (CAP. DISCRI LED lights).
3. Adjust R14 to stabilize the sampling pulse with respect to the trapezoid. At this time, a slow leftward drift at the rate of less than 40 msec in 5 seconds is acceptable.
4. Set the jig CAP. DISCRI switch to NORMAL and confirm a stable sampling pulse positionded at the center of the ramp (T_3 = 24 ± 1.5 msec).
5. Supply a NTSC color bar signal and set for the recording mode.
6. Perform the step 2.
7. Adjust R12 to stabilize the sampling pulse with respect to the trapezoid. At this time, a slow leftward drift at the rate of less than 33 msec in 5 seconds is acceptable.
8. Perform the step 4.



PAL
a = 6 ± 0.5 V
b = 11 ± 1 V
T_1= 20 ± 1.5 msec
T_2= 9.5 ± 1.5 msec

NTSC
a = 6 ± 0.5 V
b = 11 ± 1 V
T_1= 16.7 ± 1.5 msec
T_2= 9.5 ± 1.5 msec

Fig. 3-6 Capstan sampling

3.4.5 Video head switching position

A: Playback switching position

1. Play stairstep segment of JVC MH-2 alignment tape and set the tracking VR to center clik position.
2. Trigger the oscilloscope externally with the signal form TP-111 (DRUM F.FLOP) on the Y & PRE/REC board and set the oscilloscope sync slope to minus (–).
3. Connect the oscilloscope to TP-1 (VIDEO OUT) of the REAR CONNECTOR board and adjust R61 so that the fall portion of the vertical sync signal becomes positioned 6.5 H of the trigger (switching) point as shown in Fig. 3-7.

4. Set oscilloscope sync slope to pulse (+). In this condition, adjust R58 to obtain 6.5 H position.

B: Recording switching position

5. Supply a PAL color bar signal and set for the recoding mode.
6. In same manner as above step 2, 3 adjust R73 to obtain 6.5 H position at TP-1 (VIDEO OUT) of the REAR CONNECTOR board.

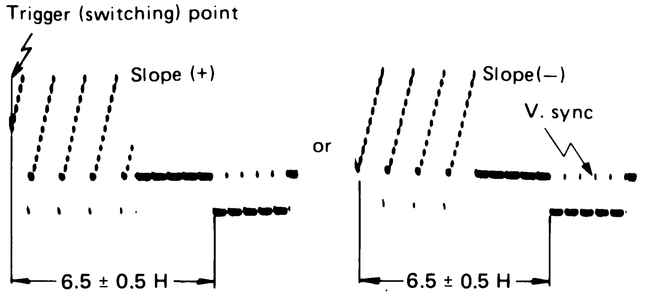


Fig. 3-7 Head switching position

3.4.6 Tracking preset

1. Supply a PAL color bar signal, record, then playback in the double-speed (X2) mode.
2. Set the tracking VR to AUTO (center click position).
3. Adjust R40 to obtain the best picture on the TV monitor.
4. Supply a NTSC color bar signal, record then playback in the double-speed (X2) mode.
5. Set the tracking VR to AUTO (center click position).
6. Adjust R42 to obtain the best picture to the TV monitor.

3.4.7 Slow pulse width

1. Supply a NTSC color bar signal, record, then playback in slow mode.
2. Set the jig selector switch to CAP. MOTOR (TP-4).
3. Adjust R32 for T = 58 msec as shown Fig. 3-8.
4. Supply a PAL color bar signal, record, then playback in slow mode.
5. Adjust R35 for T = 63 msec in Fig. 3-8.

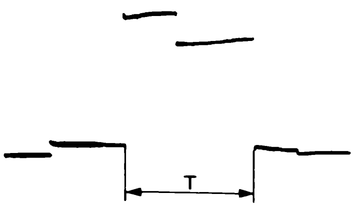


Fig. 3-8 Slow pulse

3.4.8 Slow tracking pre-set

1. Supply a SECAM color bar signal, record, then playback in slow mode.
2. Set the SLOW TRACKING VR to center click position.
3. Adjust R137 to obtain the best picture on the TV monitor.
4. Supply a NTSC color bar signal, record, then playback in slow mode.
5. Adjust R136 to obtain the best picture on the TV monitor.

3.4.9 FM noise pulse width

1. Supply a SECAM color bar signal, record, then playback in STILL mode.
2. Set the jig selector switch to FM NOISE (TP-24).
3. Adjust R141 for T = 10^{+5}_{-3} msec in the Fig. 3-9.

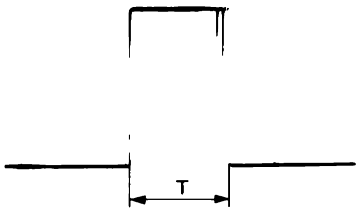


Fig. 3-9 FM noise pulse

3.4.10 Vertical pulse

1. Supply a SECAM color bar signal, record, then playback in STILL mode.
2. Trigger the oscilloscope externally with the signal from TP-111 (DRUM F.FLOP) of the Y & PRE/REC board and set the oscilloscope trigger slope to plus (+).
3. Connect oscilloscope to TP1 (VIDEO OUT) of the REAR CONNECTOR board.
4. Adjust R65 for T = 2.5 H in the Fig. 3-10.
5. Observe the picture display and adjust R68 for minimum vertical jitter.

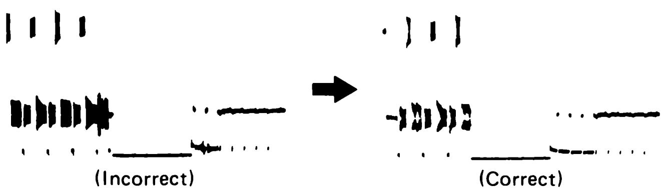


Fig. 3-10 Vertical pulse

3.4.11 Shuttle search H discriminator

1. Play SECAM color bar segment of JVC MH-5 alignment tape.
2. Connect oscilloscope to TP521 (SYNC) of the COLOR board.
3. Set the trigger slope to pulse (+) and synchronize the oscilloscope with the rising component of the waveform in the Fig. 3-11.

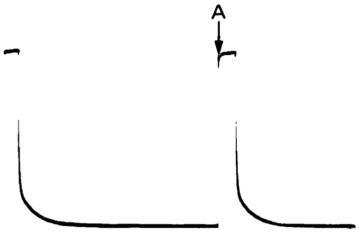


Fig. 3-11 H. sync signal

4. Set the front porch (point A) of the waveform to the center of the oscilloscope display, expand the waveform X5 (five times) and again center point A.
5. In the shuttle search FF mode, adjust R107 to position the front porch of the H sync waveform at point A (within ± 0.5 μsec). See Fig. 3-12.
6. Confirm the same value for the shuttle search REW mode.

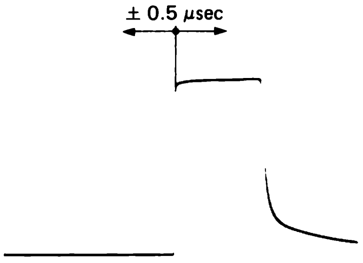


Fig. 3-12 H. discriminator

3.5 VIDEO CIRCUIT

Unless otherwise indicated, all test points and adjustments are located on the Y & PRE/REC and COLOR boards.

A: Playback system

[Y . . . Luminance signal]

3.5.1 Video head resonance, Q (quality factor) and FM equalizer

Note: This adjustment is generally unnecessary except when replacing the upper drum assembly.

– **Factory service** – (Recommended adjustment)

1. Set the SYSTEM SELECT switch to the PAL (MANUAL) position.
2. Apply the sweep signal from a video sweep generator to TP-222 (CH-1 REC OUT).
   Insert 1.0 MHz and 5 MHz markers.
3. Without inserting tape, set for Play mode. Then adjust the sweep gain so that the waveform does not distort at TP-106 (PB FM).
4. At TP-106, adjust C200 (CH-1 RESO) for maximum level at the 5 MHz marker portion.
5. Adjust R231 (CH-1 Q) so that the 5 MHz level becomes 2.5 times of the 1.0 MHz.

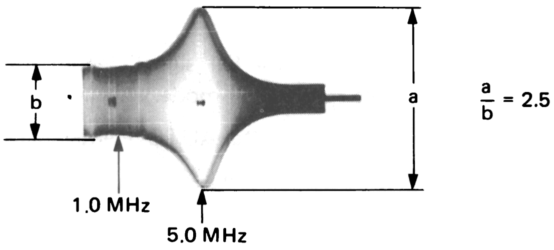


Fig. 3-13 Video head resonance and Q

6. In the same manner, adjust for CH-2. Apply sweep to TP-223 (CH-2 REC OUT) and adjust C202 (CH-2 RESO) and R232 (CH-2 Q).
7. Set the rear panel MODE SELECT SWITCH to B/W. Supply a video sweep signal with the sync signal, record then playback. Insert 100 kHz and 2 MHz markers.
8. At TP1 (VIDEO OUT) measure earch 2 MHz level for CH-1 and CH-2 outputs. Adjust Q control (R231 and R232) of the lower level channel for equal level at both channels.
9. Adjust R153 (FM EQ) so that the 2 MHz level becomes 70% of the 100 kHz.

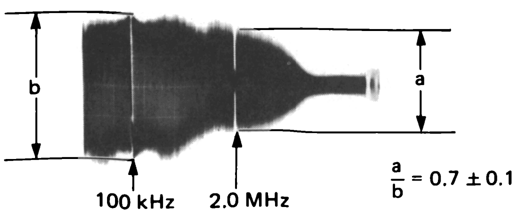


Fig. 3-14 Playback FM equalizer

— Non-factory service —

Note: The resonance point becomes lower than with adjustment by sweep generator.

1. Play RF sweep segment of JVC MH-2 alignment tape. Trigger the oscilloscope externally with the drum flip-flop signal from TP-111 (DRUM F.FLOP).
2. Monitor TP-106 (PB FM) and turn R231 (CH-1 Q) and R232 (CH-2 Q) fully counter clockwise in order to boost the highband frequency component.
3. Set the oscilloscope sync slope to minus (—) and adjust C200 (CH-1 RESO) to set the CH-1 resonance point to 4.8 MHz marker portion.
4. Set the oscilloscope sync slope to plus (+) and adjust C202 (CH-2 RESO) to set the CH-2 resonance point to 4.8 MHz.

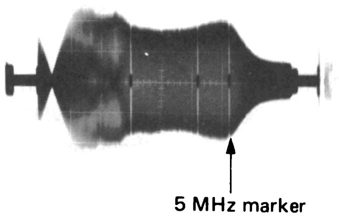


Fig. 3-15 Video head resonance (with alignment tape)

5. Set R231 and R232 (HEAD Q) to mechanical center.
6. Measure each 5 MHz FM level for CH-1 and CH-2 at TP-106 and adjust Q control (R231 or R232) of the lower level channel for equal level at both channels.

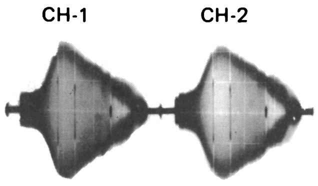


Fig. 3-16 Video head Q (with alignment tape)

7. Record an off-the-air signal, then playback. While observing the picture, adjust R153 (FM EQ) for optimum clarty. (This adjusts the sharpness and softness of the playback picture.)

3.5.2 Noise canceller

1. Connect a 0.022 μF capacitor between TP-1 and TP-GND of the VIDEO SUB board.
2. Play color bar segment of JVC MH-2 alignment tape.
3. At TP-1 (NOISE CLIP), adjust R11 (NOISE CANCEL) to minimize the output level.
4. Remove the capacitor between TP-1 and TP-GND.

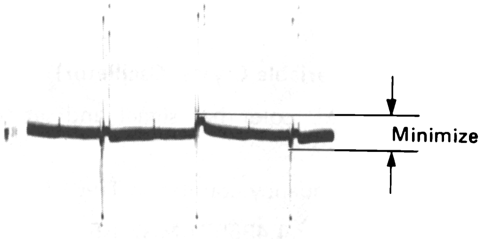


Fig. 3-17 Noise canceller

3.5.3 Playback Y level

1. Play color bar segment of JVC MH-2 alignment tape.
2. Adjust R101 (PB Y LEVEL CCIR) for 1.9 Vp-p at TP-1 (VIDEO OUT) of the REAR CONN. board without load as shown in Fig. 3-18.
3. Play NTSC color bar segment of JVC MH-5 alignment tape.
4. Adjust R105 (PB Y LEVEL NTSC) for 1.9 Vp-p at TP-1 (VIDEO OUT) of the REAR CONN. board without load as shown in Fig. 3-18.

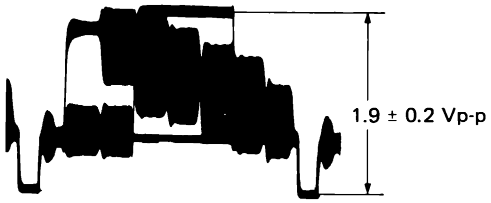


Fig. 3-18 PB Y level

[Color signal]

3.5.4 Playback subcarrier oscillator

1. Set the SYSTEM SELECT switch for NTSC (MODF.) position.
2. Play NTSC color bar segment of JVC MH-5 alignment tape and connect a frequency counter to TP-603.
3. Adjust R611 for 4.433619 MHz ± 50 Hz.

3.5.5 PAL AFC (Automatic Freqency Control)

1. Set the SYSTEM SELECT switch for AUTO position.
2. Supply a PAL color bar signal and set for the STOP (E-E) mode.
3. Connect a 680Ω resistor between TP-603 and TP-622.
4. Connect a freqency counter to TP-612 and adjust R624 for 625 kHz ± 2 kHz.
5. Remove a resistor between TP-603 and TP-622.

3.5.6 PAL VXO (Variable Crystal Oscillator)

1. Supply a PAL color bar signal and set for the STOP (E-E) mode.
2. Connect a frequency counter to TP-612.
3. Adjust C602 for 4.435571 MHz ± 50 Hz.

B: Recording system

[Y . . . Luminance signal]

3.5.7 Carrier and deviation

NOTE: These adjustments are generally unnecessary except when replacing IC106 or IC107. Before adjustment, turn R216 (WHITE CLIP) and R219 (DARK CLIP) fully counterclockwise.

1. Supply a PAL color bar signal and set for the STOP (E-E) mode.
2. Connect oscilloscope to IC107 pin 18 and precisely measure the DC potential of the sync tip. Make a note of this as voltage "A".

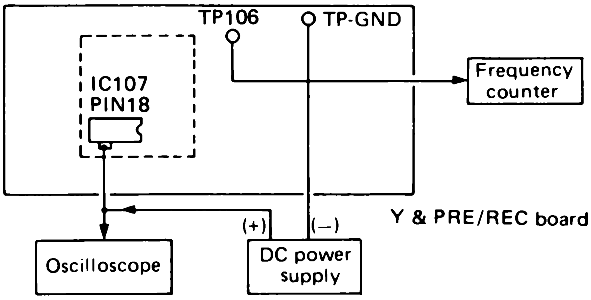


Fig. 3-19 Carrier and deviation

3. Connect a DC power supply between IC107 pin 18 and ground. Without an input signal, set for the STOP (E-E) mode and precisely apply sync tip bias "A" as observed with the oscilloscope.
4. Connect a frequency counter to TP-106 (REC FM IN) and adjust R291 (CARRIER) for 3.8 MHz $^{+0}_{-50}$ kHz.
5. Supply a NTSC color bar signal set for the STOP (E-E) mode.
6. Similarity apply sync tip bias "A" as observed with the oscilloscope.
7. Adjust R293 for 3.4 MHz ± 30 kHz.
8. Carefully adjust the DC power supply to obtain 4.4 MHz ("A" Hz + 1 MHz ± 30 kHz) at TP-106 (REC FM IN). Precisely read the voltage of IC107 pin 18 with the oscilloscope. Make a note of this as voltage "B".
9. Disconnect the DC power supply. Supply a color bar signal and set for the STOP (E-E) mode.
10. Turn R201 fully counterclockwise to the direction of R202, and adjust R203 (DEVIATION) so that the white peak at IC205 pin 18 becomes equal to voltage "B".
11. About step 8, 9, 10, f = 4.8 MHz ("A" Hz + 1 MHz $^{+0}_{-50}$ kHz) set the input signal PAL color bar and confirms like the above example.

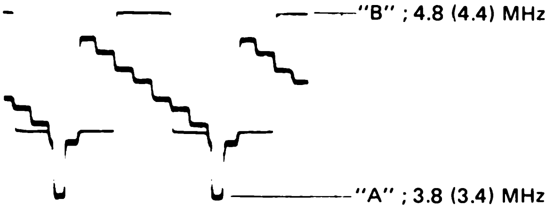
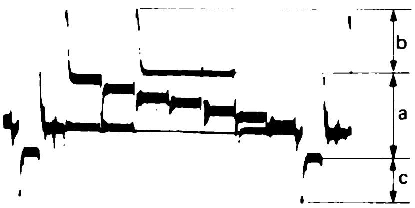


Fig. 3-20 FM modulation

3.5.8 White and dark clip

1. Supply a PAL color bar signal and set for the STOP (E-E) mode.
2. At TP-103 (W/D CLIP OUT), with the rated signal level taken as 100%, adjust R216 (WHITE CLIP) so that the white peak overshoot becomes 80% as shown in Fig. 3-21.
3. In the same condition, adjust R219 (DARK CLIP) so that the sync tip undershoot becomes 40%.



White clip
a : b = 1 : 0.8 ± 0.02
Dark clip
a : c = 1 : 0.4 $^{+0.05}_{-0}$

Fig. 3-21 White and dark clip

3.5.9 Recording FM level

1. Supply a NTSC color bar signal and set for the Recording mode.
2. Adjust R249 so that the pedestal level of the vertical blanking component becomes 0.17 V at TP204 of the VIDEO HEAD board.
3. Supply a PAL color bar signal and set for the recording mode.
4. Similarity adjust R251 that the pedestal level becomes 0.15 V.

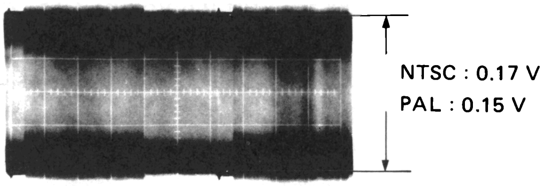


Fig. 3-22 Recording FM level

3.5.10 E-E video level

1. Supply a PAL color bar signal and set for the STOP (E-E) mode.
2. Adjust R189 (E-E LEVEL) for 1.9 Vp-p at TP-1 (VIDEO OUT) of the REAR CONNECTOR board without load.

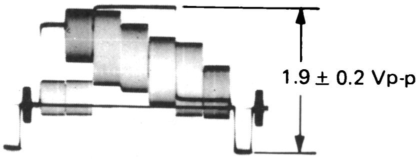


Fig. 3-23 E-E video signal

[Color signal]

3.5.11 PAL Recording color level

1. Play color bar segment of JVC MH-2 alignment tape and connect oscilloscope to TP-604.
2. Measure the CH-1 output "a". See Fig. 3-24. Make a note of this as level "a".

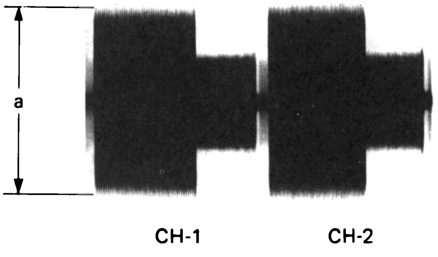


Fig. 3-24 PAL Recording color level

3. Supply a PAL color bar signal, record, then playback.
4. During recording, adjust R671 so that during playback, the CH-1 output becomes 110% with respect to level "a" at TP-604, i.e., adjust during recording and check during playback.

3.5.12 PAL converter valance

1. Supply a PAL color bar signal, record, then playback.
2. Connect oscilloscope to TP-621.
3. Adjust R621 for minimum leakage of the 5.1 MHz component.

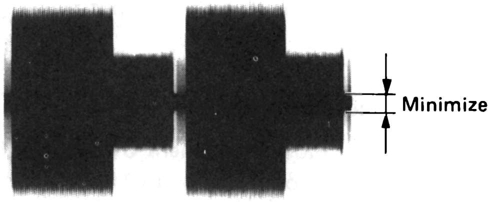


Fig. 3-25 PAL converter valance

3.5.13 PAL PB burst level

1. Supply a PAL color bar signal, record, then playback.
2. Connect oscilloscope to TP-1 (VIDEO OUT) of the REAR CONNECTOR board.
3. Adjust R616 for 0.5 ± 0.04 V of burst signal without load.

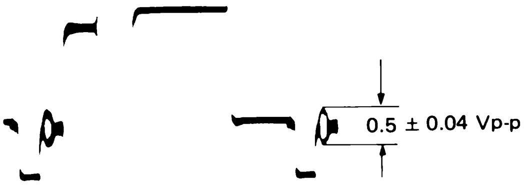


Fig. 3-26 PAL PB burst level

3.5.14 REC input bell

1. Supply a SECAM color bar signal and set for the STOP (E-E) mode.
2. Adjust L501 for minimum amplitude difference between (a) and (b) at TP-501 as shown Fig. 3-27.

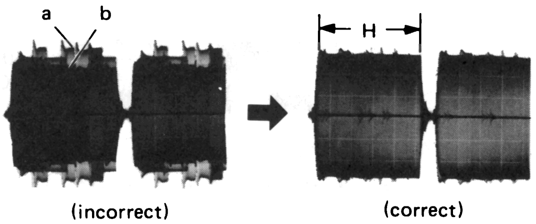


Fig. 3-27 REC input bell

3.5.15 REC output bell

1. Supply a SECAM color bar signal and set for the STOP (E-E) mode.
2. Adjust L502 so that the amplitude of line (n) violet and line (n + 1) violet are equal to each other at TP-502 as shwon Fig. 3-28.

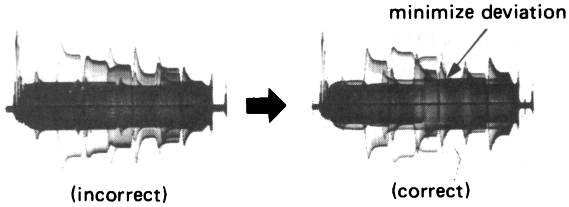
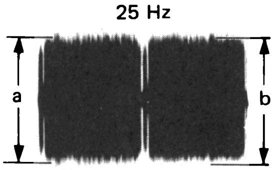


Fig. 3-28 REC output input bell

3.5.16 SECAM recording color level

1. Play SECAM color bar segment of JVC MH-5 alignment tape and connect oscilloscope to TP-501.
2. Measure the average of CH-1 output "a" and CH-2 output "b". See Fig. 3-29. Make a note of this as level "c".



$c = \frac{a+b}{2}$

Fig. 3-29 SECAM recording color level

3. Supply a SECAM color bar signal, record, then playback.
4. During recording, adjust R545 so that during playback, the average of CH-1 output and CH-2 output becomes 140 ± 10% with respect to level "c" at TP-501, i.e., adjust during recording and check during playback.

3.5.17 SECAM playback color level

1. Supply a SECAM color bar, record, then playback.
2. Connect oscilloscope to TP-1 (VIDEO OUT) of the REAR CONNECTOR board.
3. Adjust R543 to obtain a violet level of 0.4 V without load.

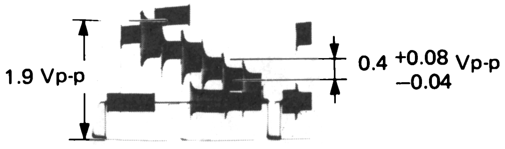


Fig. 3-30 SECAM playback color level

3.5.18 SECAM detector-1

1. Set the SYSTEM SELECT switch for SECAM (STD.) position.
2. Supply a SECAM color bar signal and set for the STOP (E-E) mode.
3. Adjust R554 for 4.5 ± 0.5 Vp-p at TP-522.
4. Turn L503 (SECAM DET-1) and adjust for maximum waveform at TP-522.
5. Play SECAM color bar segment of JVC MH-5 alignment tape.
6. Adjust R554 for 6.0 ± 0.5 Vp-p at TP-522.

3.5.19 SECAM detector-2

1. Set the SYSTEM SELECT switch for SECAM (MODF.) position.
2. Supply a SECAM color bar signal, record, then palyback.
3. Adjust R683 for 6.0 ± 0.5 Vp-p at TP-623.

3.6 AUDIO CIRCUIT

Unless otherwise indicated, all test points and adjustments are located on the AUDIO board.

3.6.1 Playback level

1. Play 1 kHz audio signal segment of JVC MH-2 alignment tape.
2. Adjust R70 (PLAY LEVEL) for −6 ± 1 dBs at AUDIO OUT terminal (CONN. 42).

3.6.2 Bias level

1. Set for the Recording mode without signal.
2. Connect a digital voltmeter between CONN. 112 and CONN. 111 on the AUDIO/CTL HEAD board.
3. Adjust R125 for 2.0 ± 0.1 mV (RMS).

3.6.3 Recording level and equalizer

1. Supply a PAL video signal and a 1 kHz audio signal at −20 dBs and record, then playback.
2. During recording, adjust R93 (REC LEVEL CCIR) to obtain −6 ± 1 dBs at AUDIO OUT terminal during playback, i.e., adjust during recording and check during playback.
3. Supply 1 kHz and 10 kHz audio signals at −30 dBs and record, then playback.
4. During recording, adjust R95 (REC EQ CCIR) so that during playback, 10 kHz level becomes $^{+0}_{-3}$ dB of the 1 kHz level at the AUDIO OUT terminal, i.e., adjust during recording and check during playback.
5. Supply a NTSC video signal and a 1 kHz audio signal at −20 dBs and record, then playback.
6. During recording, adjust R163 (REC LEVEL NTSC) to obtain −6 ± 1 dBs at AUDIO OUT terminal during playback, i.e., adjust during recording and check during playback.
7. Supply 1 kHz and 10 kHz audio signals at −30 dBs and record, then playback.
8. During recording, adjust R160 (REC EQ NTSC) so that during playback, 10 kHz level becomes $^{+0}_{-3}$ dB of the 1 kHz level at the AUDIO OUT terminal, i.e., adjust during recordig and check during playback.

3.7 TUNER/IF CIRCUIT

Unless otherwise indicated, all test points and adjustments are located in the TUNER/IF and TUNER/IF SUB boards.

3.7.1 Equipment requird

1. IF sweep signal generator with suitable markers (PIF, SIF etc.).
2. RF color TV signal generator.
    1) F-4ch : SECAM color bar signal and 1 kHz audio signal
    P.C. Frequency ..... 200.00 MHz
    S.C. Frequency ..... 206.50 MHz
    2) E-7ch : PAL color bar signal and 1 kHz audio signal
    P.C. Frequency ..... 189.25 MHz
    S.C. Frequency ..... 194.75 MHz
3. DC power supplies for AGC bias (approx. 5 V varriable)
4. Oscilloscope
5. Spectrum analyzer
6. IF sweeper probe (IF sweep signal supply cable) as shown in Fig. 3-31.

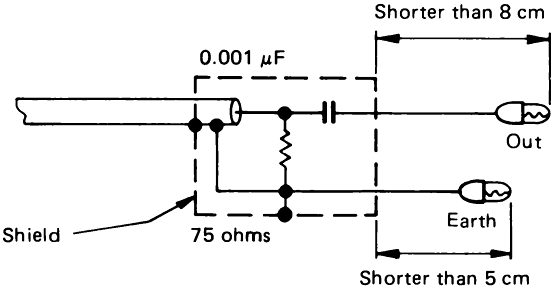


Fig. 3-31 Sweeper probe

3.7.2 VIF

1. Disconnect the antenna cable from the antenna input connector.
2. Push channel select button of "1".
3. Set the CH PRESET switch to "ON" and the band select switch to "Ⅲ".
4. Adjust the tuning control VR to 10 V DC at conn. 211 (BT IN).
5. Set the IF sweep generator output level to 30 dB and connect the generator output to the test point of the tuner module.
6. Apply AGC bias 5 V DC between IC2-22pin and GND.
7. Adjust AGC bias for 0.6 Vp-p at IC2-14pin.

8. Adjust T3(SECAM LLD) so that the rising component of the 38.9 MHz marker becomes muximum level. (TP: IC2-14pin)
9. Adjust T4(SECAM AFC) so that the rising component of the 38.9 MHz marker becomes minimum level.
10. Adjust T5(PIF COIL) so that the rising component of the 36.7 MHz marker becomes muximum level.
11. Push channel select button of "6".
12. Adjust T6(PAL SOUND TRAP) so that the 1 kHz modulation carrier becomes minimum level.
13. Push channel select button of "1".
14. Adjust R66(30.9 MHz TRAP) so that the rising ocmponent of the 30.9 MHz marker becomes minimum level.
15. Adjust TUNER IF CORE so that the rising component of the 38.15 MHz maker becomes maximum level.
16. Adjust T2(SAW MACHING) so that the rising component of the 38.15 MHz marker becomes maximum level.
17. Push channel select button of "6".
18. Adjust T1(PAL SOUND TRAP) so that the 1 kHz modulation carrier becomes minimum level.
19. Push channel select button of "1".
20. Adjust R20(SECAM-H, U SOUND TRAP) so that the 1 kHz modulation carrier becomes minimum level.
21. Adjust T2 and T5 to satify Fig. 3-32.

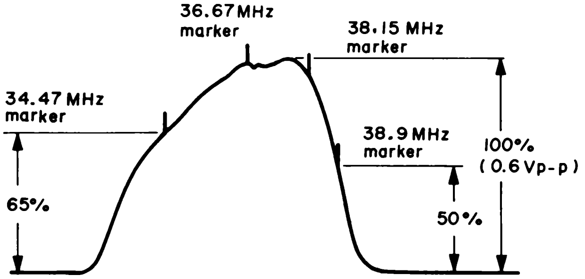


Fig. 3-32 VIF adjustment

25. Set the CH PRESET switch to "OFF".

3.7.3 SIF

1. Disconnect the antenna cable from the antenna input connector.
2. Push channel select button of "6".
3. Set the CH PRESET switch to "ON" and band select switch to "Ⅲ".
4. Adjust the tuning control VR to 10 V DC at conn. 211 (BT IN).
5. Set the IF sweep generator output level to 40 dB and connect the generator output to the test point of the tuner module.
6. Adjust T804(PAL SOUND LLD) so that the rising component of the 38.9 MHz marker becomes maximum level. (TP: IC802-12pin)

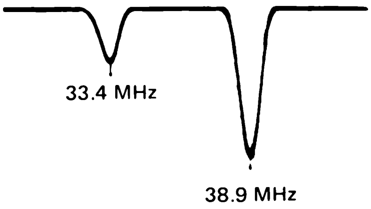


Fig. 3-33 PAL SIF tuning

7. Adjust T803(PAL SOUND SAW) so that the rising component of the 38.9 MHz marker becomes maximum level. (TP : IC802-12pin)
8. Set the IF sweep generator output level to 55 dB.
9. Adjust T801 and T802 so that the rising component of the 32.4 MHz marker becomes maximum level. (TP : IC801-11pin)
10. Set the CH PRESET switch to "OFF".

3.7.4 RF

1. Set the TV signal generator output level of F-4ch to 76 dBμ and connect the generator output to the antenna input connector.
2. Connect a spectrum analyzer to the IF output terminal of the tuner module and set the analyzer to allow measurement of 38.9 MHz ± 20 kHz IF carrier frequency.
3. In the manual tuning mode with AFC OFF, perform fine tuning to where the spectrum analyzer indecates in the range of 38.9 ± 100 kHz.
4. Set the AFC switch to "ON".
5. Adjust T4 (AFC) to obtain 38.9 MHz ± 20 kHz.
6. Turn R45(SECAM NOISE) to the extreme clockwise direction and measure the 38.9 MHz marker level. Then slowly turn R45 back so that the 38.9 MHz marker level becomes 1/5th of maximum level.
7. Adjust R49 to 1.8 Vp-p at IC2-14pin.

8. Set the TV signal generator output level of E-7ch to 76 dBμ and connect the generator output to the antenna input connector.
9. Repeat step 2 to 4.
10. Confirm the IF carrier frequency of 38.9 ± 20 kHz.
11. If not, readjustment of the same manner as steps 1 and 5.
12. Turn R46(PAL NOISE) to the extreme clockwise direction and measure the 38.9 MHz marker level. Then slowly turn R45 back so that the 38.9 MHz marker level becomes 3/10th of maximum level.
13. Adjust R53(PAL Y LEVEL) to 2.65 Vp-p at IC2-14pin.

3.7.5 Output level

1. Set the TV signal generator output level of F-4ch to 76 dBμ and connect the generator output to the antenna input connector.
2. Connect the oscilloscope to conn. 41 (VIDEO OUT).
3. Adjust R86(SECAM SYNC LEVLE) and R82(SECAM COLOR LEVEL) to satify Fig. 3-34.

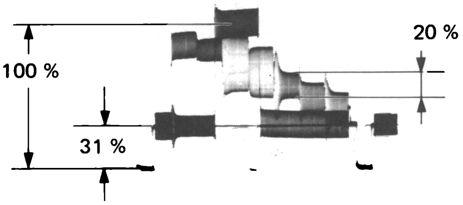


Fig. 3-34 Video output

4. Adjust R825(SECAM AUDIO LEVEL) to −17 ± 0.5 dBs with 56 kΩ load at conn. 31 (AUDIO OUT).
5. Set the TV signal generator output level of E-7ch to 76 dBμ and connect the generator output to the antenna input connector.
6. Adjust R53 (PAL VIDEO LEVEL) to satify Fig. 3-35.

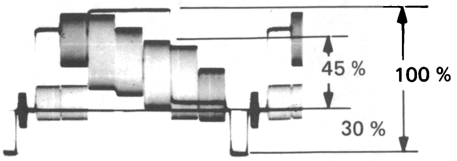


Fig. 3-35 Video output

7. Repeat 12 and 13 of 3.7.4.
8. Adjust R104 (PAL COLOR LEVEL) to satify Fig. 3-35.
9. Adjust R846(PAL AUDIO LEVEL) to −18.4 ± 0.5 dBs with 56 kΩ load.

3.8 TUNER/TIMER CTL CIRCUIT

Unless otherwise indicated, all test points and adjustments are located on the TUNER/TIMER CTL board. Set for the Stop (E-E) mode.

3.8.1 DAC (digital to analog converter) clock

1. Connect oscilloscope to IC202 pin 3 and connect the signal output terminal of the oscilloscope to a frequency counter.
2. Check for frequency of 1.3 MHz ±0.1 MHz and level of more than 3 V_{p-p}.

3.8.2 Timer CTL clock

1. Connect oscilloscope to TP201 (TIMER CTL CLOCK) and connect the signal output terminal of the oscilloscope to a frequency counter.
2. Adjust C233 (3.84 MHz ADJ) to obtain 3,840,000 Hz ± 10 Hz.

3.8.3 Tuner CTL clock

1. Connect oscilloscope to IC207 pin 1 and connect the signal out terminal of the oscilloscope to a frequency counter.
2. Confirm frequency of 400 kHz ±10 kHz and level of more than 6 V_{p-p}.

3.8.4 BT (band tuning voltage)

1. Connect oscilloscope to CONN. 89 (BT OUT) and set the CH PRESET switch to ON.
2. Set the Band Select switch to I (VHF channels 2 to 4) and turn the Tuning control fully counter-clockwise. Confirm DC voltage of 0.6 V.
3. Set the Band Select switch to U (UHF channels 21 to 69) and turn the Tuning control fully clockwise. Confirm DC voltage of 29 V.

3.8.5 BV, BS and BU

1. Set the CH PRESET switch to ON and the Band Select switch sequentially to positions I, III and U.
2. Use a digital voltmeter and measure the voltages at tuner BV, BS and BU terminals. Check for values indicated in Table 3-2.

Voltage / Band	BV	BS	BU
I (V_L)	More than 11.5 V	More than 30 V	Less than 0.8 V
III (V_H)	More than 11.5 V	Less than 0.8 V	Less than 0.8 V
U	Less than 0.8 V	Less than 0.8 V	More than 11.5 V

Table 3-2 BV, BS and BU voltages

3.8.6 Display clock

1. Connect oscilloscope to IC401 pin 1 of the DISPLAY board and connect the signal out terminal of the oscilloscope to a frequency counter.
2. Confirm oscillation frequency of 400 kHz ±10 kHz and level of more than 6.0 Vp-p.

SECTION 4
CHARTS AND DIAGRAMS

4.1 KEY TO ABBREVIATIONS

A	AC	: Alternating Current
	ACC	: Automatic Color Control
	A/CTL	: Audio/Control
	ADD	: Adder
	ADC	: Analog to Digital Converter
	ADJ	: Adjustment
	A DUB	: Audio Dub
	AE	: Audio Erase
	AEF	: Automatic Editing Function
	AFC	: Automatic Frequency Control
	AFT	: Automatic Fine Tuning
	AGC	: Automatic Gain Control
	AH	: Audio Head
	AHD	: Audio High Density
	AL	: After Loading
	ALC	: Automatic Ligh Compensation Automatic Level Control
	A/S/M	: Audio/Servo/Mechacon
	ALM	: Alarm
	ALU	: Arithmetic Logic Unit
	AM	: Amplitude Modulation
	AMP	: Amplifier
	ANT	: Antenna
	APC	: Automatic Pedestal Control Automatic Phase Control
	APL	: Average Picture Level
	ASS'Y	: Assembly
	ATT	: Attenuator
	AUTO	: Automatic
	AUX	: Auxiliary
	AUD	: Audio
B	B	: Base
	BAL	: Balance
	BATT	: Battery
	BBD	: Bucket Brigade Device
	BCD	: Binary Coded Decimal
	BEG	: Beginning
	BFP	: Burst Flag Pulse
	BUFF	: Buffer
	BIT	: Binary Digit
	BLK	: Black
	BLU	: Blue
	BNC	: Bayonet Connector
	BOT	: Beginning of Tape
	BPF	: Bandpass Filter
	BRK	: Brake
	BRN	: Brown
	BRT	: Brightness
	BT	: Band Tuning
	BW or B/W	: Black and White
C	C	: Capacitance
	CAP	: Capstan
	CAR	: Carrier
	CASS	: Cassette
	CCT	: Circuit
	CdS	: Cadmium Sulphide
	CD	: Countdown
	CF	: Ceramic Filter, Color Frame
	CC	: Cassette Compartment
	CE	: Chip Enable
	CH	: Channel
	CHG	: Charge
	CHROMA	: Chrominance
	CLK	: Clock
	CLR	: Clear
	CMOS	: Complementary Metal Oxide Silicon
	CMD	: Command
	CNT	: Count, Counter
	CONV	: Converter
	COL	: Color
	COM	: Common
	COMB	: Combination Comb Filter
	COMP	: Comparator Composite Compensation
	CONN	: Connector
	CPC	: Capstan Phase Control
	CTC	: Crosstalk Cancel
	CPU	: Central Processing Unit
	CTL	: Control
D	D	: Drum
	DAC	: Digital to Analog Converter
	dB	: Decibel
	DC	: Direct Current
	DD	: Direct Drive
	DEC	: Decoder
	DEMOD	: Demodulator
	DEMUX	: Demultiplexer
	DET	: Detector
	DEV	: Deviation
	DFRS	: Drum Free RUN STOP
	DIF TRANS	: Differential Transformer
	DISCR	: Discriminator
	DL	: Delay Line
	DOC	: Dropout Compensator
	DPC	: Drum Phase Control
	DYAC	: Dynamic Aperture Control
E	E	: Edit
	EDP	: Electronic Data Processing
	E-E	: Electric to Electric
	EF	: Emitter-Follower
	EMP	: Emphasis
	ENC	: Encoder
	EN	: Enable
	ENV	: Envelope
	EOT	: End of Tape
	EP	: Extended Play
	EQ	: Equalizer
	ES	: Electronic Switch
	ESNS	: End Sensor
	EXP	: Expander
	EXT	: External
F	F	: Farad
	F ADV	: Frame Advance
	FDP	: Fluorescent Display Panel
	FE	: Full Erase
	FET	: Field Effect Transistor
	FF	: Fast Forward Flipflop
	FG	: Frequency Generator
	FM	: Frequency Modulation
	FMA	: FM Audio
	FR	: Full Recording, Frame
	FREQ	: Frequency
	F-V CONV	: Frequency to Voltage Converter
	FWD	: Forward
	FWD S	: Forward Search
G	G	: Green
	GEN	: Generator
	GND	: Ground
	GRN	: Green
	GRY	: Gray
H	H	: High
	HBF	: Horizontal Burst Flag
	HD	: Horizontal Drive
	HG	: Hall Generator
	HPF	: Highpass Filter
	Hz	: Herz
I	IC	: Integrated Circuit
	ID	: Identification (Pulse)
	IF	: Intermediate Frequency
	IFR	: Infrared
	IFT	: Intermediate Frequency Transfomer

IND : Indicator
INH : Inhibit
INS : Insert
INT : Internal, Interrupt
INV : Inverter
I/O : Input/Output
IR : Infrared

L
L : Low
LED : Light Emitting Diode
LIN : Linearity
LIM : Limiter
LOAD : Loading (Cassette)
LP : Long Play
LPF : Lowpass Filter
LSB : Lower Sidebband

M
M : Motor
MAX : Maximum
MDA : Motor Drive Amplifier
MECHACON : Mechanism Control
MIC : Microphone
MIN : Minimum
MIX : Mixer
MMV : Monostable Multivibrator
MOD : Modulation
MODEM : Modulator-Demodulator
MON : Monitor
MOS : Metal Oxide Silicon
MPX : Multiplexer
MS : Mode Select
MUT : Muting

N
NAND : Not-And
NC : Not Connected
NFB : Negative Feedback
NLN : Non-Linear
NO : Normally Open
NOR : Normal

O
OPAMP : Operational Amplifier
OP : Operation
ORN : Orange
OSC : Oscillator

P
PB : Playback
PC : Photocoupler, Pulse Counter
PCM : Pulse Code Modulation
PGM : Program
PG : Pulse Generator
PI : Photo Interrupter
PLL : Phase Locked Loop
p-p : Peak-to-Peak
POS : Position
PR : Pinch Roller
PREAMP : Preamplifier
PRL : Preroll
P/S : Pause/Still
PSC : Pulse Swallowing Control
PU : Pickup
PWB : Printed Wiring Board
PWM : Pulse Width Modulation
PWR : Power

Q
Q : Quality Factor

R
R : Red
RA : Resistor Array
RAM : Random Access Memory
REC : Recording
REG : Regulated
REM : Remote
REMOCON : Remote Control (Unit)
REV : Reverse
REV S : Reverse Search
REW : Rewind
RF : Radio Frequency
RS FF : RS Flipflop
RST : Reset
R/P : Record/Playback
RPT : Repeat
RT : Rotary Transformer
RUN : Running
RY : Relay

S
SC : Subcarrier, Simulcast
SAW : Sawtooth
SCH : Search
SEL : Select
SENS : Sensor
SEP : Separator
SF : Source Follower
SFF : Short Fast Forward
SIF : Sound Intermediate Frequency
SN : Signal to Noise Ratio
SOL : Solenoid
SOS : Sound on Sound
SP : Standard Play
SR : Supply Reel
SREW : Short Rewind
S/S : Slow/Still
SSG : Sync Signal Generator
SSNS : Start Sensor
STD : Strobe Data
SUP : Supply
SW : Switch
SWD : Switched
SYNC : Synchronization
SYSCON : System Control

T
TBC : Time Base Corrector
TP : Test Point
TPZD : Trapezoid
TR : Transistor; Transformer
TU : Take-Up
TC : Tension Control, Time code
TAL : Tally
TEN : Tension
TK : Tracking
TIM : Timing
T/T : Tuner/Timer

U
UL : Unloading
UNREG : Unregulated
UNSW : Unswitched

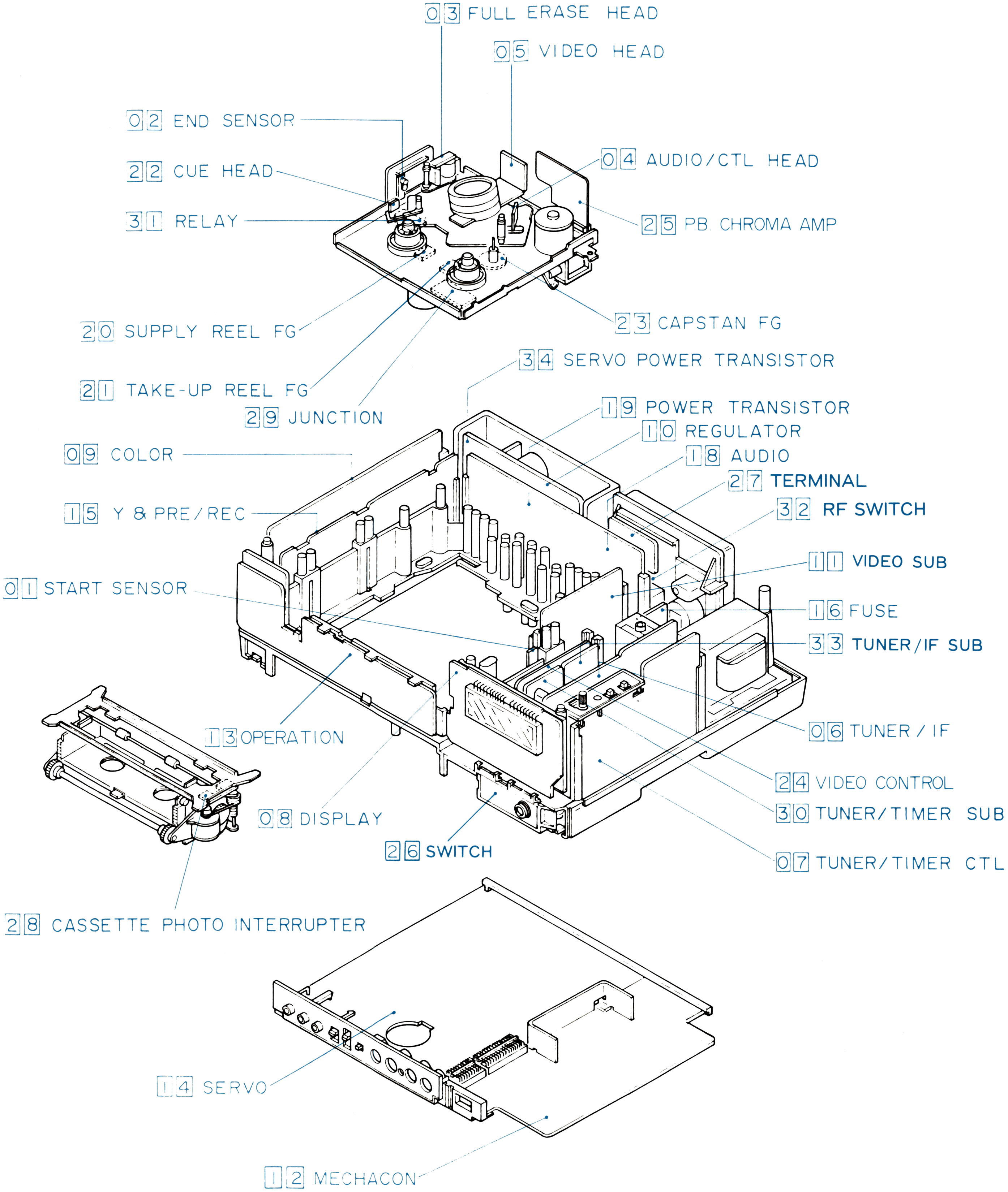
V
V : Volt
V : Volt
VACT : Video Action
VCO : Voltage Controlled Oscillator
VD : Vertical Drive
VIF : Video Intermediate Frequency
VR : Variable Resistor
VS : Video and Sync
VXO : Variable Crystal Oscillator
VLT : Violet
V/T : Video/Television
V/U : VHF/UHF
VSCH : Variable Search

W
W : Watt
WHT : White
WV : Working Voltage
W & D : White and Dark
WARN : Warning

X
XTAL : Crystal

Y
Y : Luminance
YEL : Yellow

4.2 CIRCUIT BOARD LOCATIONS


03 FULL ERASE HEAD
05 VIDEO HEAD
02 END SENSOR
04 AUDIO/CTL HEAD
22 CUE HEAD
31 RELAY
25 PB. CHROMA AMP
20 SUPPLY REEL FG
23 CAPSTAN FG
34 SERVO POWER TRANSISTOR
21 TAKE-UP REEL FG
29 JUNCTION
19 POWER TRANSISTOR
10 REGULATOR
09 COLOR
18 AUDIO
27 TERMINAL
15 Y & PRE/REC
32 RF SWITCH
11 VIDEO SUB
01 START SENSOR
16 FUSE
33 TUNER/IF SUB
13 OPERATION
06 TUNER / IF
24 VIDEO CONTROL
08 DISPLAY
30 TUNER/TIMER SUB
26 SWITCH
07 TUNER/TIMER CTL
28 CASSETTE PHOTO INTERRUPTER
14 SERVO
12 MECHACON

4.2.1 CONNECTIONS

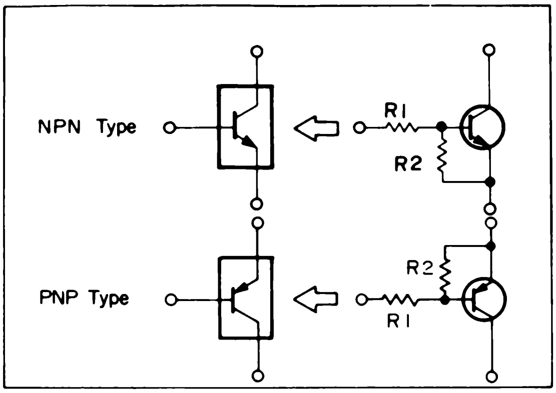
▣ : Connector
○ : Board
□ : Board in connector
⬭ : Connected pattern in the board.

4.2.2 INDICATIONS

COUNT UP : Active only at high.
$\overline{\text{COUNT DOWN}}$: Active only at low.

4.2.3 DIGITAL TRANSISTOR

DIGITAL TRANSISTOR



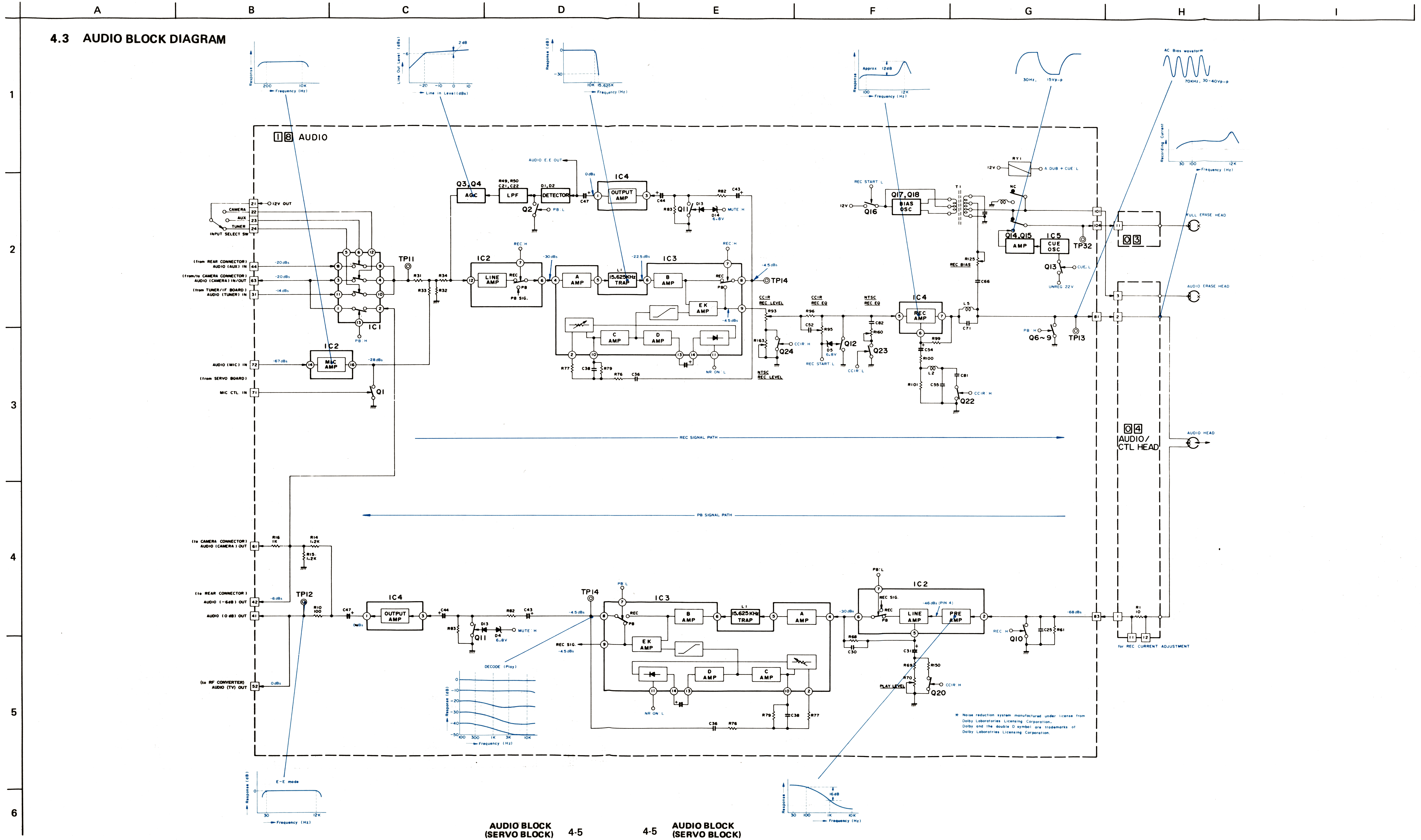
RESISTOR VALUES

JUNCTION	Part NO.	R1 (KΩ)	R2 (KΩ)
PNP	DTA114	10	10
	DTA124	22	22
	DTA144	47	47
	DTA144WF	47	22
	DTA114Y	10	47
	DTA114T	10	OPEN
NPN	DTC114	10	10
	DTC124	22	22
	DTC144	47	47
	DTC144WT	47	22
	DTC114Y	10	47
	DTC143T	4.7	OPEN

Note: The digital transistor includes built in resistors.
It features small size and high reliability.
Both PNP and NPN types are available.

USES: INVERTER, INTERFACE, DRIVER CIRCUITS.

4.3 AUDIO BLOCK DIAGRAM

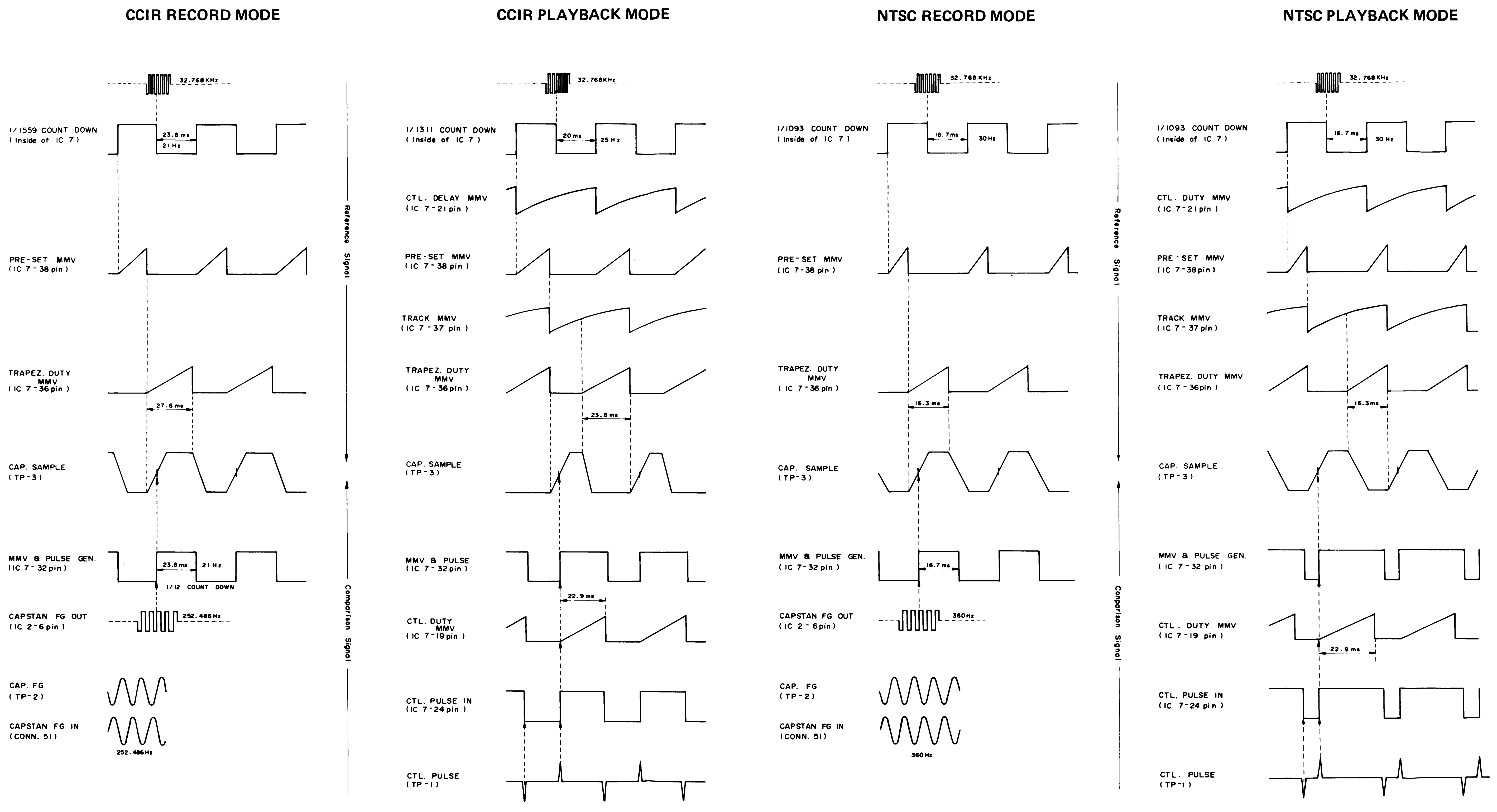

A
B
C
D
E
F
G
H
I
1
2
3
4
5
6
18 AUDIO
Frequency (Hz)
Line in Level (dBs)
10K 15.625K
AUDIO E.E OUT
0dBs
Q3, Q4
AGC
R49, R50
C21, C22
LPF
D1, D2
DETECTOR
IC4
OUTPUT AMP
Q2
PB:L
R82
C43
C47
C44
R83
Q11
D13
D14 6.8V
MUTE:H
12V OUT
CAMERA
AUX
TUNER
INPUT SELECT SW
(from REAR CONNECTOR) AUDIO (AUX) IN
(from/to CAMERA CONNECTOR) AUDIO (CAMERA) IN/OUT
(from TUNER/IF BOARD) AUDIO (TUNER) IN
-20dBs
-14dBs
IC1
PB:H
TP11
R31
R33
R32
R34
IC2
LINE AMP
REC
PB
PB SIG.
REC:H
-30dBs
-22.5dBs
A AMP
L1
15.625KHz TRAP
IC3
B AMP
EK AMP
C AMP
D AMP
-4.5dBs
TP14
NR ON:L
R77
C38
R79
R76
C36
MIC AMP
-67dBs
-28dBs
AUDIO (MIC) IN
(from SERVO BOARD)
MIC CTL. IN
Q1
CCIR REC LEVEL
NTSC REC LEVEL
R93
R163
Q24
CCIR:H
CCIR REC EQ
R96
C52
R95
D5 6.8V
Q12
REC START:L
NTSC REC EQ
C82
R160
Q23
CCIR:L
REC AMP
R99
C54
R100
L2
R101
C55
C81
Q22
L5
C71
C66
R125
REC BIAS
REC START:L
12V
Q16
Q17, Q18
BIAS OSC
T1
RY1
A.DUB + CUE:L
NC
Q14, Q15
AMP
IC5
CUE OSC
TP32
Q13
CUE:L
UNREG 22V
PB:H
Q6~9
TP13
101
104
81
03
FULL ERASE HEAD
AUDIO ERASE HEAD
04
AUDIO/CTL HEAD
AUDIO HEAD
Recording Current
30 100 12K
30Hz, 15Vp-p
AC Bias waveform
70KHz, 30-40Vp-p
REC SIGNAL PATH
PB SIGNAL PATH
(to CAMERA CONNECTOR) AUDIO (CAMERA) OUT
R16 1K
R14 1.2K
R15 1.2K
(to REAR CONNECTOR) AUDIO (-6dB) OUT
-6dBs
AUDIO (0dB) OUT
TP12
R10 100
(to RF CONVERTER) AUDIO (TV) OUT
0dBs
D4 6.8V
REC SIG.
DECODE (Play)
Response (dB)
PRE AMP
-46dBs (PIN 4)
REC SIG.
R68
C30
C31
R69
R150
R70
PLAY LEVEL
Q20
REC:H
Q10
C25
R61
-68dBs
83
R1 10
for REC CURRENT ADJUSTMENT
E-E mode
16dB

* Noise reduction system manufactured under license from Dolby Laboratories Licensing Corporation.
Dolby and the double D symbol are trademarks of Dolby Laboratries Licensing Corporation.

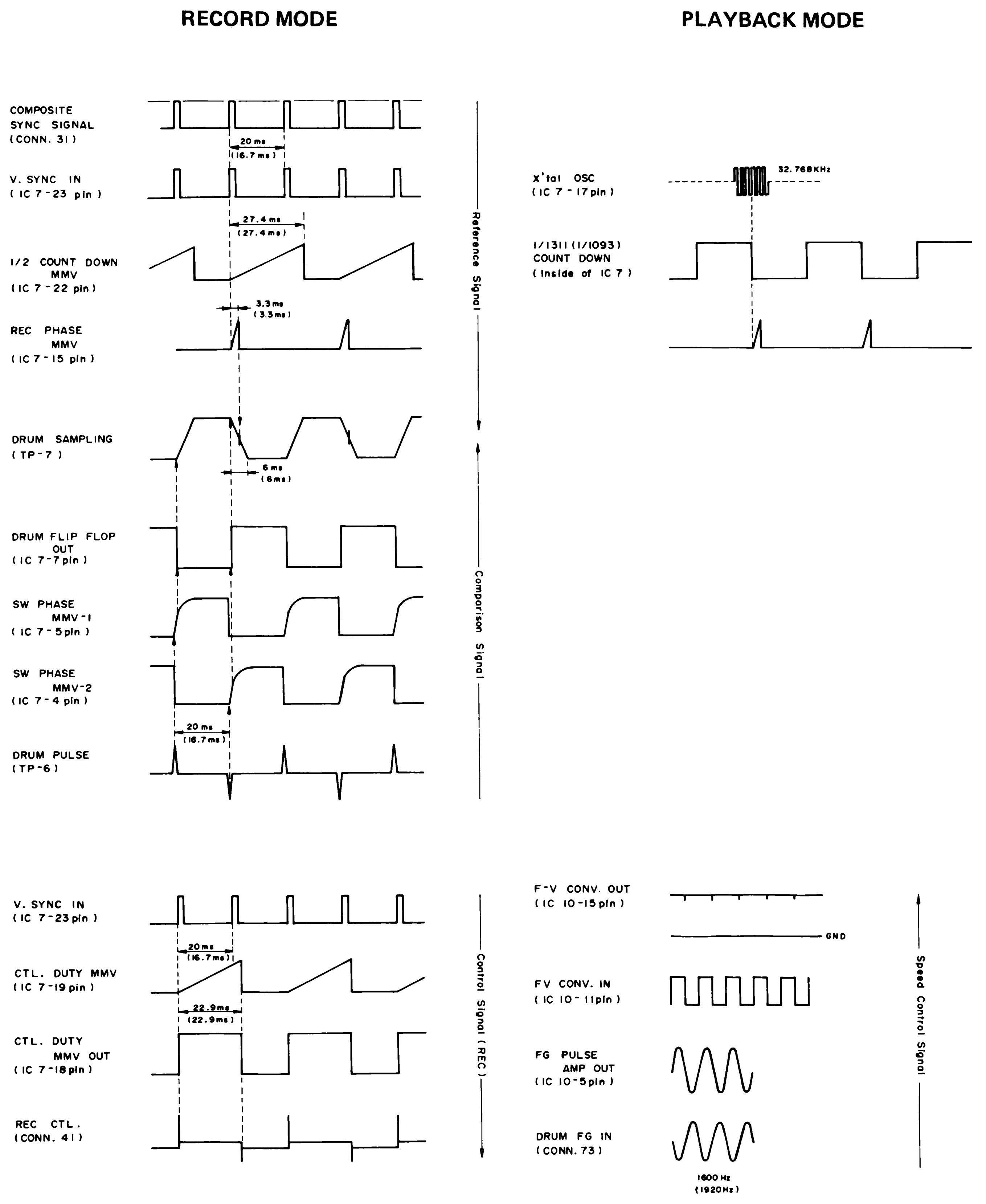
4.4 SERVO BLOCK SYSTEM

CONTROL HEAD
04 A/CTL HEAD
31 RELAY
CAPSTAN MOTOR
34 SERVO POWER TRANSISTOR
23 CAP. FG
04 RELAY
DRUM PICK UP HEAD
22 CUE HEAD
DRUM MOTOR
IC 2 CAP. FG AMP
IC 2 SCHMITT
LPF
CTL PULSE AMP
SCHMITT
IC 3
IC 4 VOLTAGE FOLLOWER
IC 4 MIX
Q3 E.F.
Q11 POWER AMP
IC 5
IC 6
MODE CONTROL
IC 7
PRE SET MMV
TRACK MMV
TRAPEZOID DUTY MMV
TRAPEZOID
SAMPLE & HOLD
MMV & P.GAIN
COUNT DOWN
1/2.C.D. MMV
CTL DELAY MMV
SW PHASE MMV 1
SW PHASE MMV 2
70°DELAY MMV
FLIP FLOP
V.PULSE POS. MMV
V.PULSE WIDTH MMV
REC PHASE
32KHz OSC
CTL DUTY MMV
DISCRI (F/V)
IC 8 INV. AMP
LPF
LOOP FILTER
LIMITER
IC 12
IC 13 VOLTAGE FOLLOWER
IC 13 MIX
ACTIVE FILTER
IC 10 DISCRI (F/V)
IC 10 SCHMITT
IC 10 DRUM FG AMP
IC 13 INV. AMP
L.P.F
IC 14
INPUT GAIN CTL
RECTIFIER
CONTROL AMP
ROTATION CONTROL
HALL BIAS
IC 16 D.F. FLOP MMV
IC 17 FM NOISE DETECTOR
IC 17 SLOW SPEED COMP
Q7, IC15 CUE AMP
IC 15 CUE DET
SYSTEM SELECT SWITCH
SEARCH SWITCH
AUDIO NR SWITCH
INSERT SWITCH
CAPSTAN PHASE DET ERROR
DRUM PHASE DET ERROR
CAPSTAN ERROR
REEL DISCRI ERROR
DRUM DISCRI ERROR
SLOW SPEED MMV
DRUM F. FLOP OUT (to Y & PRE/REC, 15-84)
V. PULSE OUT (to Y & PRE/REC, 15-85)
POWER ON L (to REGULATOR, 10-8)
A B C D E F G H I J K L M N O P
1 2 3 4 5 6

4.5 CAPSTAN SERVO TIMING CHART


CCIR RECORD MODE
32.768KHz
1/1559 COUNT DOWN (Inside of IC 7)
23.8 ms
21 Hz
PRE-SET MMV (IC 7-38 pin)
TRAPEZ. DUTY MMV (IC 7-36 pin)
27.6 ms
CAP. SAMPLE (TP-3)
MMV & PULSE GEN. (IC 7-32 pin)
23.8 ms
21 Hz
1/12 COUNT DOWN
CAPSTAN FG OUT (IC 2-6 pin)
252.486 Hz
CAP. FG (TP-2)
CAPSTAN FG IN (CONN. 51)
252.486 Hz
Reference Signal
Comparison Signal
CCIR PLAYBACK MODE
32.768KHz
1/1311 COUNT DOWN (Inside of IC 7)
20 ms
25 Hz
CTL. DELAY MMV (IC 7-21 pin)
PRE-SET MMV (IC 7-38 pin)
TRACK MMV (IC 7-37 pin)
TRAPEZ. DUTY MMV (IC 7-36 pin)
23.8 ms
CAP. SAMPLE (TP-3)
MMV & PULSE (IC 7-32 pin)
22.9 ms
CTL. DUTY MMV (IC 7-19 pin)
CTL. PULSE IN (IC 7-24 pin)
CTL. PULSE (TP-1)
NTSC RECORD MODE
32.768 KHz
1/1093 COUNT DOWN (Inside of IC 7)
16.7 ms
30 Hz
PRE-SET MMV (IC 7-38 pin)
TRAPEZ. DUTY MMV (IC 7-36 pin)
16.3 ms
CAP. SAMPLE (TP-3)
MMV & PULSE GEN. (IC 7-32 pin)
16.7 ms
CAPSTAN FG OUT (IC 2-6 pin)
360Hz
CAP. FG (TP-2)
CAPSTAN FG IN (CONN. 51)
360 Hz
Reference Signal
Comparison Signal
NTSC PLAYBACK MODE
32.768 KHz
1/1093 COUNT DOWN (Inside of IC 7)
16.7 ms
30 Hz
CTL. DUTY MMV (IC 7-21 pin)
PRE-SET MMV (IC 7-38 pin)
TRACK MMV (IC 7-37 pin)
TRAPEZ. DUTY MMV (IC 7-36 pin)
16.3 ms
CAP. SAMPLE (TP-3)
MMV & PULSE GEN. (IC 7-32 pin)
CTL. DUTY MMV (IC 7-19 pin)
22.9 ms
CTL. PULSE IN (IC 7-24 pin)
CTL. PULSE (TP-1)

4.6 DRUM SERVO TIMING CHART

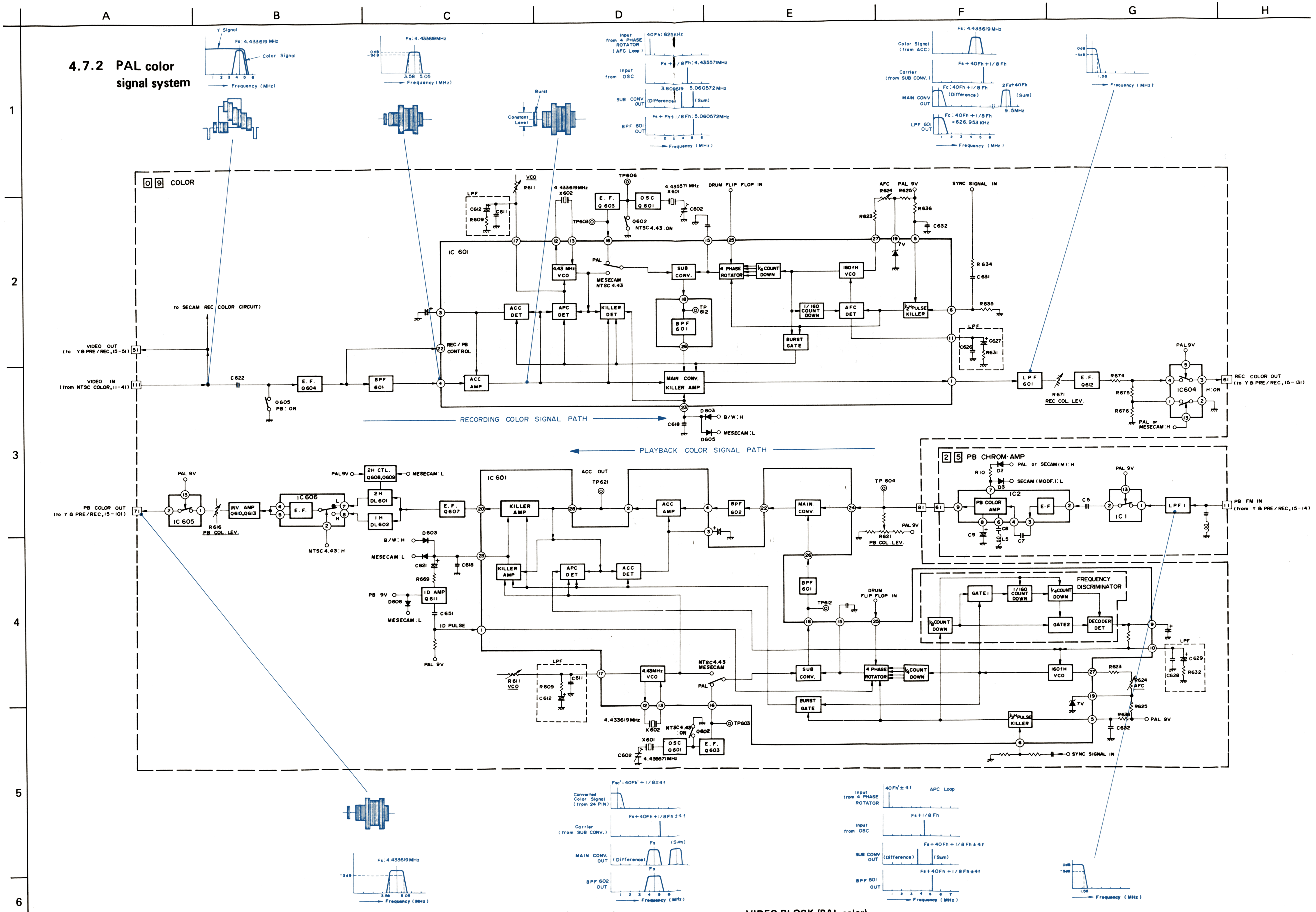

RECORD MODE
COMPOSITE SYNC SIGNAL (CONN. 31)
20 ms
(16.7 ms)
V. SYNC IN (IC 7-23 pin)
27.4 ms
(27.4 ms)
1/2 COUNT DOWN MMV (IC 7-22 pin)
3.3 ms
(3.3 ms)
REC PHASE MMV (IC 7-15 pin)
DRUM SAMPLING (TP-7)
6 ms
(6 ms)
DRUM FLIP FLOP OUT (IC 7-7 pin)
SW PHASE MMV-1 (IC 7-5 pin)
SW PHASE MMV-2 (IC 7-4 pin)
20 ms
(16.7 ms)
DRUM PULSE (TP-6)
Reference Signal
Comparison Signal
V. SYNC IN (IC 7-23 pin)
20 ms
(16.7 ms)
CTL. DUTY MMV (IC 7-19 pin)
22.9 ms
(22.9 ms)
CTL. DUTY MMV OUT (IC 7-18 pin)
REC CTL. (CONN. 41)
Control Signal (REC)
PLAYBACK MODE
X'tal OSC (IC 7-17 pin)
32.768KHz
1/1311 (1/1093) COUNT DOWN (Inside of IC 7)
F-V CONV. OUT (IC 10-15 pin)
GND
FV CONV. IN (IC 10-11 pin)
FG PULSE AMP OUT (IC 10-5 pin)
DRUM FG IN (CONN. 73)
1600 Hz
(1920Hz)
Speed Control Signal

4.7 VIDEO BLOCK DIAGRAM

4.7.1 Luminance signal system

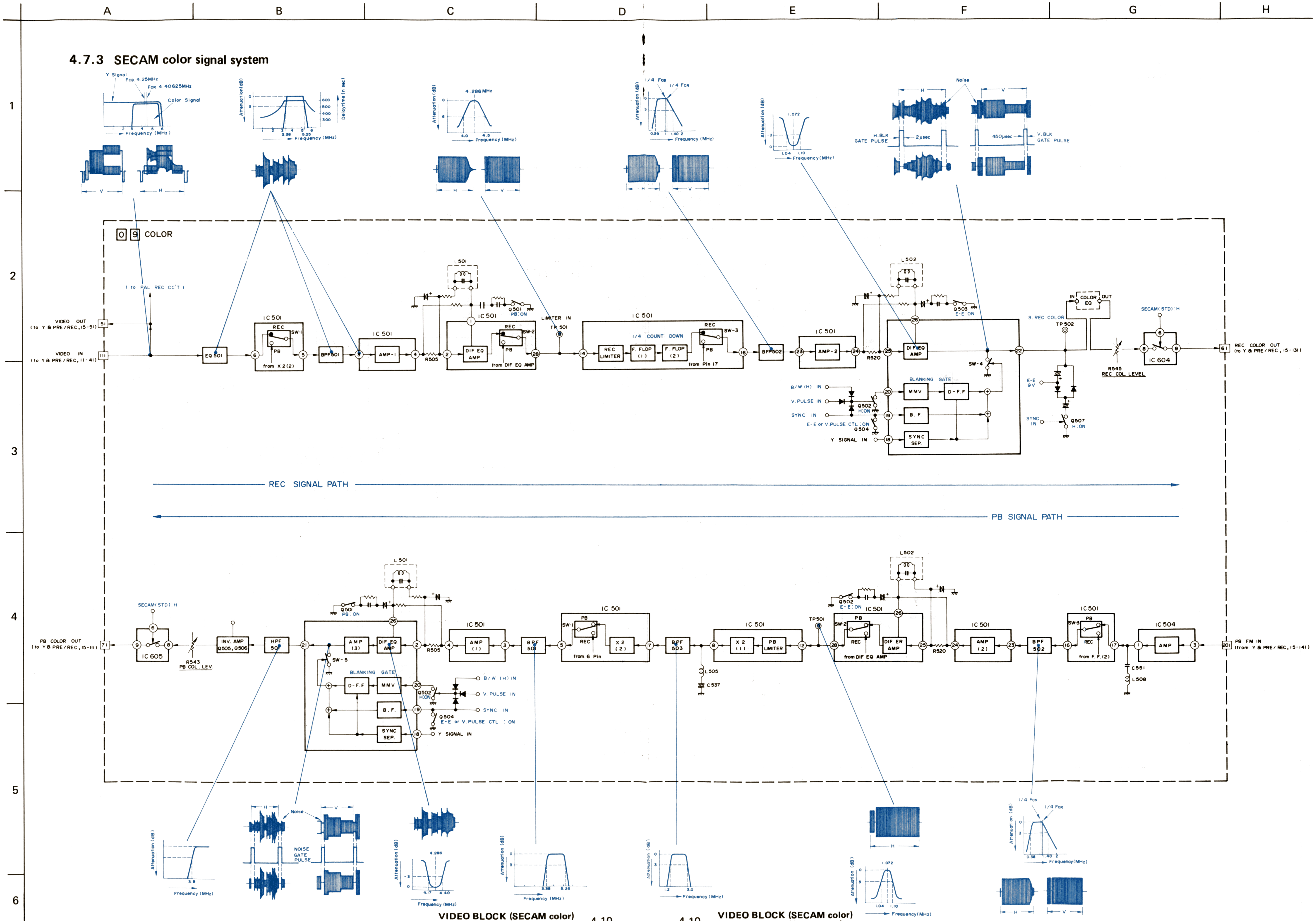
A
B
C
D
E
F
G
H
I
J
K
L
M
N
O
P
Q
R
1
2
3
4
5
6
VIDEO CONTROL
COLOR
Y & PRE / REC
VIDEO SUB
HEAD CONN
VIDEO HEADS
IC 3
IC 4
IC101
IC102
IC103
IC104
IC106
IC107
IC108
IC109
IC110
IC111
IC113
IC114
IC1
IC2
Q101
Q102
Q103
Q104
Q107
Q108
Q109
Q110
Q116
Q120
Q121
Q122
Q124
Q125
Q126
Q127
Q128
Q129
Q130
Q131
Q135
Q136
Q138
Q139
Q140
Q141
DL101
TP103
TP106
TP1
TP204
TP222
TP223
CLAMP
E.F.
AGC DET
KEYED AGC
S.SEP & DELAY
CLAMP & MIX
E-E AMP
NOISE CANCELLER
NON-LIN DE-EMPHA
SYNC SEPA
Y/C MIX
SQUELCH
DIFFER AMP
EQ
MIXER
DEMOD
LIMITER
DOUBLE LIMITER
FM MOD
W/D CLIP
MAIN PRE-EMPHA
NON-LIN PRE-EMPHA
DE-EMPHA
REC AMP-1
REC AMP-2
FM AGC
DOC DET
SW AMP
AGC DET
CH-1 PRE AMP
CH-2 PRE AMP
FM EQ
EQ AMP
NOISE CANCEL
CLIP & H.P.AMP
DIFFERENTIAL AMP
EQ1
EQ2
LPF1
LPF2
SUB CARRIER TRAP
RECORDING SIGNAL PATH
PB SIGNAL PATH
ROTARY TRANSFORMERS
CH-1
CH-2
DRUM F.F IN (from SERVO BOARD)
FM REC OUT (to SERVO BOARD)
DRUM F.F IN (from SERVO BOARD)
CHANNEL SET 9V (from MODE SELECT SWITCH)
VIDEO IN
VIDEO OUT
TUNER
AUX
CAMERA

4.7.2 PAL color signal system



A
B
C
D
E
F
G
H
1
2
3
4
5
6
Y Signal
Fs: 4.433619 MHz
Color Signal
Frequency (MHz)
0dB
-3dB
3.58 5.05
Burst
Constant Level
Input from 4 PHASE ROTATOR (AFC Loop)
40Fh: 625KHz
Input from OSC
Fs + 1/8 Fh: 4.43557 1MHz
SUB CONV OUT
(Difference)
(Sum)
3.808619 5.060572 MHz
BPF 601 OUT
Fs + Fh + 1/8 Fh: 5.060572MHz
Color Signal (from ACC)
Carrier (from SUB CONV.)
Fs + 40Fh + 1/8 Fh
MAIN CONV OUT
Fc: 40Fh + 1/8 Fh
2Fs + 40Fh
9.5MHz
LPF 601 OUT
Fc: 40Fh + 1/8 Fh = 626.953 KHz
1.56
09 COLOR
IC 601
VCO
R611
LPF
C612
C611
R609
4.433619MHz X602
TP603
TP606
E. F. Q603
OSC Q601
Q602 NTSC 4.43 : ON
4.435571 MHz X601
C602
DRUM FLIP FLOP IN
AFC R624
PAL 9V R625
R623
R636
C632
SYNC SIGNAL IN
7V
R634
C631
R635
PAL
MESECAM NTSC 4.43
4.43 MHz VCO
SUB CONV.
4 PHASE ROTATOR
1/4 COUNT DOWN
160 fH VCO
ACC DET
APC DET
KILLER DET
TP 612
BPF 601
1/160 COUNT DOWN
AFC DET
1/2 H PULSE KILLER
BURST GATE
C627
C626
R631
to SECAM REC COLOR CIRCUIT
VIDEO OUT (to Y & PRE/REC, 15-51)
VIDEO IN (from NTSC COLOR, 11-41)
C622
E. F. Q604
BPF 601
REC/PB CONTROL
ACC AMP
MAIN CONV. KILLER AMP
Q605 PB: ON
D603 B/W: H
C618
D605 MESECAM: L
RECORDING COLOR SIGNAL PATH
LPF 601
R671 REC COL. LEV.
E.F. Q612
R674
R675
R676
PAL 9V
IC604
H: ON
PAL or MESECAM: H
REC COLOR OUT (to Y & PRE/REC, 15-131)
PLAYBACK COLOR SIGNAL PATH
25 PB CHROM·AMP
R10
D2
PAL or SECAM(M): H
D3
SECAM (MODF.): L
IC2
PB COLOR AMP
E·F
C9
C8
L5
C7
C5
IC1
LPF1
PB FM IN (from Y & PRE/REC, 15-14)
PAL 9V
PB COLOR OUT (to Y & PRE/REC, 15-101)
IC 605
R616 PB COL. LEV.
INV. AMP Q610,Q613
IC606
E. F.
2H CTL. Q608,Q609
MESECAM: L
2H DL601
1H DL602
NTSC 4.43: H
E. F. Q607
KILLER AMP
ACC OUT
TP621
ACC AMP
BPF 602
MAIN CONV
TP 604
R621 PB COL. LEV.
B/W: H
D603
MESECAM: L
C621
C618
R669
ID AMP Q611
PB 9V
D606
C651
MESECAM: L
ID PULSE
PAL 9V
KILLER AMP
APC DET
ACC DET
BPF 601
TP612
DRUM FLIP FLOP IN
FREQUENCY DISCRIMINATOR
GATE1
1/160 COUNT DOWN
1/4 COUNT DOWN
1/8 COUNT DOWN
GATE2
DECODER DET
C629
C628
R632
R611 VCO
R609
C611
C612
4.43MHz VCO
NTSC4.43 MESECAM
SUB CONV.
4 PHASE ROTATOR
1/4 COUNT DOWN
160 fH VCO
R623
R624 AFC
R625
R636
PAL 9V
C632
BURST GATE
1/2 H PULSE KILLER
4.433619MHz
X602
NTSC 4.43 : ON
Q602
TP603
X601
OSC Q601
E. F. Q603
C602
4.435571MHz
SYNC SIGNAL IN
Fsc': 40Fh' + 1/8 ± 4f
Converted Color Signal (from 24 PIN)
Carrier (from SUB CONV.)
Fs + 40Fh + 1/8 Fh ± 4f
MAIN CONV. OUT
Fs
(Difference)
(Sum)
BPF 602 OUT
Input from 4 PHASE ROTATOR
40Fh' ± 4f
APC Loop
Input from OSC
Fs + 1/8 Fh
SUB CONV OUT
Fs + 40Fh + 1/8 Fh ± 4f
BPF 601 OUT
Fs: 4.433619 MHz
-3dB
3.58 5.05
Frequency (MHz)
0dB
-3dB
1.56

4.7.3 SECAM color signal system


A
B
C
D
E
F
G
H
1
2
3
4
5
6
Y Signal
Fcb 4.25MHz
Fcr 4.40625MHz
Color Signal
Frequency (MHz)
Attenuation (dB)
Delaytime (n sec)
Frequency (MHz)
4.286 MHz
1/4 Fcb
1/4 Fcr
1.072
H.BLK GATE PULSE
2 µsec
Noise
450 µsec
V.BLK GATE PULSE
0 9 COLOR
(to PAL REC CC'T)
VIDEO OUT (to Y & PRE/REC, 15-51)
VIDEO IN (to Y & PRE/REC, 11-41)
EQ 501
IC 501
REC
PB
SW-1
from X 2 (2)
BPF 501
AMP-1
R505
L501
Q501 PB: ON
DIF EQ AMP
SW-2
from DIF EQ AMP
LIMITER IN
TP 501
REC LIMITER
1/4 COUNT DOWN
F. FLOP (1)
F. FLOP (2)
SW-3
from Pin 17
BPF 502
AMP-2
R520
L502
Q503 E-E: ON
SW-4
BLANKING GATE
MMV
D-F.F
B. F.
SYNC SEP.
B/W (H) IN
V. PULSE IN
SYNC IN
Q502 H: ON
E-E or V. PULSE CTL: ON
Q504
Y SIGNAL IN
S. REC COLOR
TP 502
COLOR EQ
E-E 9V
Q507 H: ON
R545 REC COL. LEVEL
SECAM (STD): H
IC 604
REC COLOR OUT (to Y & PRE/REC, 15-131)
REC SIGNAL PATH
PB SIGNAL PATH
PB COLOR OUT (to Y & PRE/REC, 15-111)
IC 605
R543 PB COL. LEV.
INV. AMP Q505, Q506
HPF 501
AMP (3)
SW-5
AMP (1)
BPF 501
X 2 (2)
from 6 Pin
BPF 503
L505
C537
X 2 (1)
PB LIMITER
TP501
DIF ER AMP
from DIF EQ AMP
AMP (2)
BPF 502
from F. F (2)
C551
L508
IC 504
AMP
PB FM IN (from Y & PRE/REC, 15-141)
NOISE GATE PULSE
Frequency (MHz)

4.8 MECHACON TIMING CHART

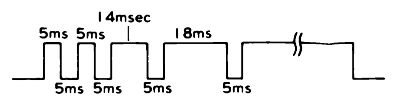
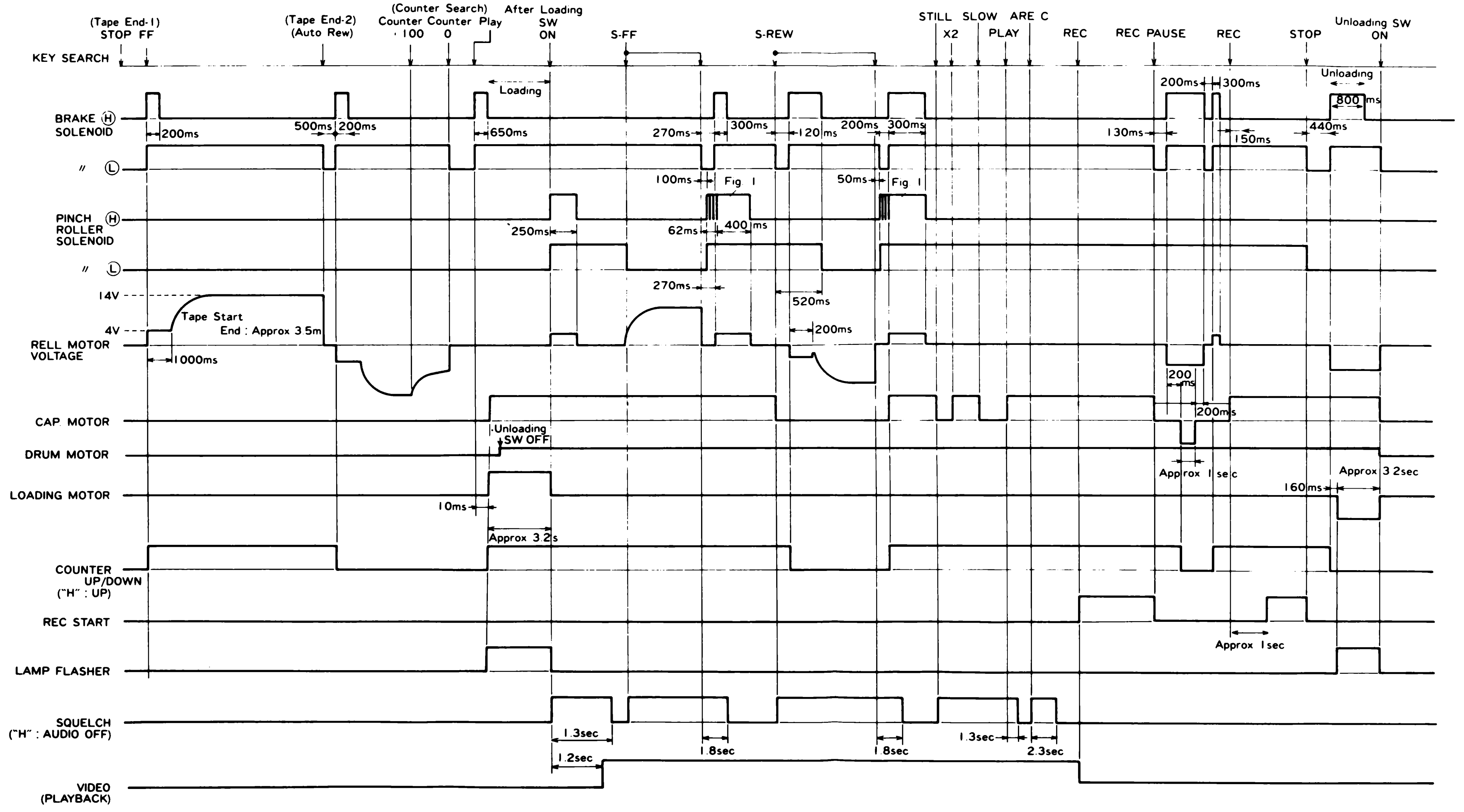


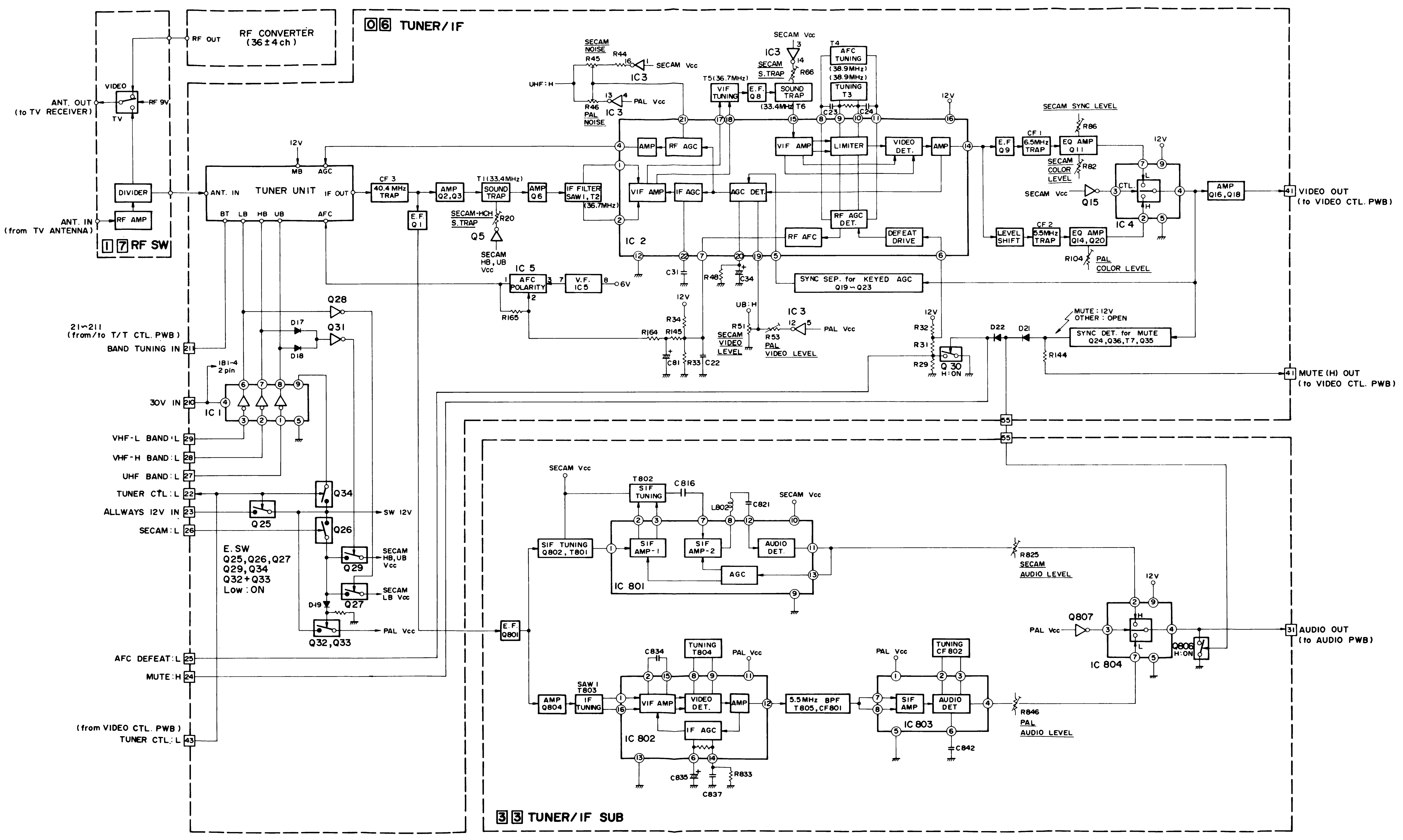
Fig 1



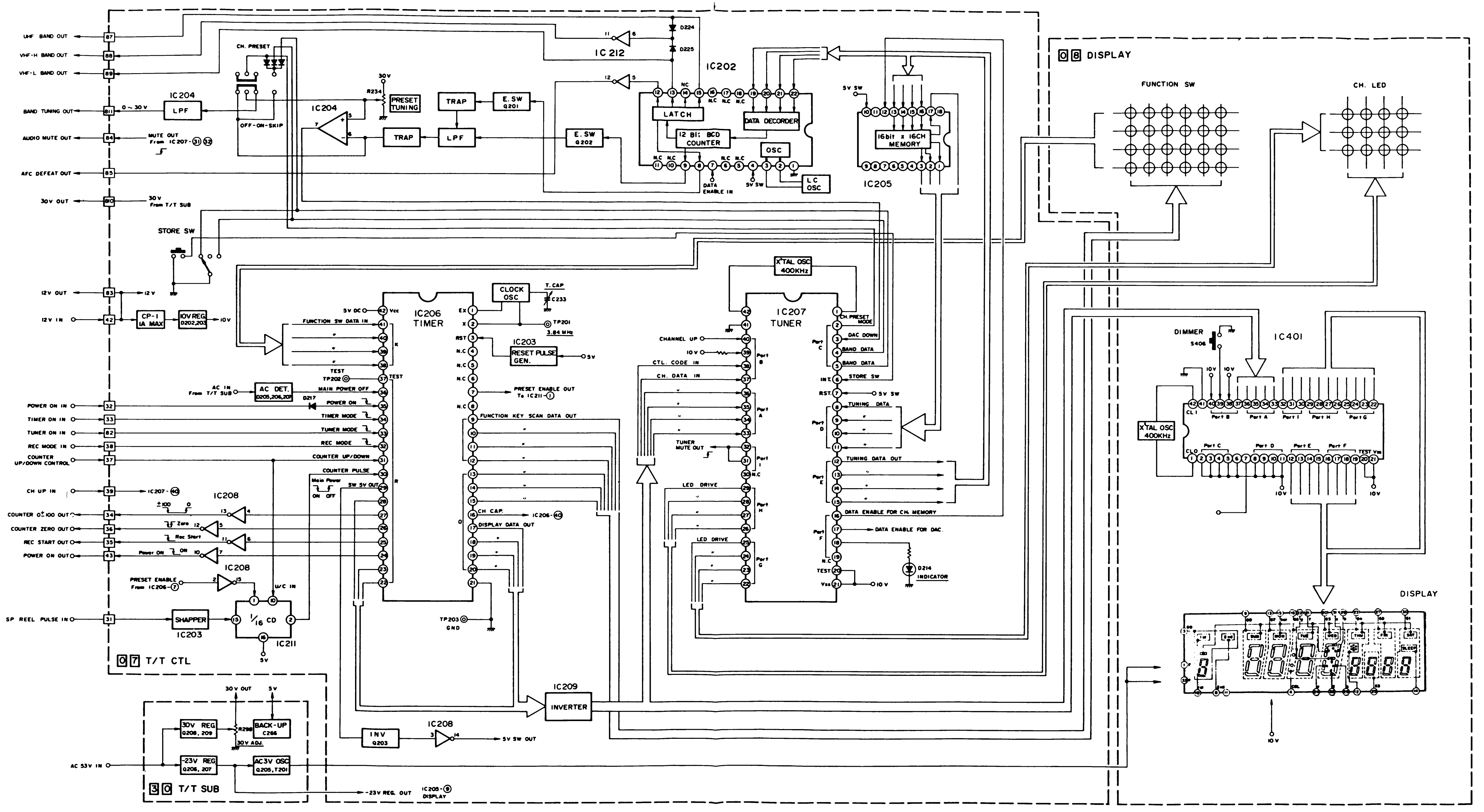
4.9 MODE SHIFT TABLE

	STOP	PLAY	STILL/ PAUSE	SLOW	X 2	FRAME ADV.	S. FF	S. REW	FF	REW	REC PLAY	REC PAUSE	A. DUB PLAY	A. DUB PAUSE	PAUSE
STOP		○	X	X	X	X	X	X	○	○	○	○	○	○	○
PLAY	○		○	○	○	X	○	○	○ (S. FF)	○ (S. REW)	○	○	○	○	○
STILL	○	○		○	○	○	○	○	○ (S. FF)	○ (S. REW)	○	○	○	○	○
SLOW	○	○	○		○	X	○	○	○ (S. FF)	○ (S. REW)	○	○	○	○	○
X 2	○	○	○			X	○	○	○ (S. FF)	○ (S. REW)	○	○	○	○	○
S. FF	X (PLAY)	○	X (PLAY)	X (PLAY)	X (PLAY)	X (PLAY)	○	X (PLAY)		X (PLAY)	X (PLAY)	X (PLAY)	X (PLAY)	X (PLAY)	X (PLAY)
S. REW	X (PLAY)	○	X (PLAY)	X (PLAY)	X (PLAY)	X (PLAY	X (PLAY)	○	X (PLAY)		X (PLAY)	X (PLAY)	X (PLAY)	X (PLAY)	X (PLAY)
FF	○	○	X	X	X	X	X	X		○	○	○	○	○	○
REW	○	○	X	X	X	X	X	X	○		○	○	○	○	○
REC PLAY	○		○ REC PAUSE	X	X	X	X	X	X	X		○	X	X	X
REC PAUSE	○	○ REC PLAY		X	X	X	X	X	X	X	○		X	X	X
A. DUB PLAY	○		○ A. DUB PAUSE	X	X	X	X	X	X	X	○	○		○	X
A. DUB PAUSE	○	○ A. DUB PAUSE		X	X	X	X	X	X	X	○	○	○		X
EJECT LOADING	○	○	X	X	X	X	X	X	○	○	○	○	○	○	
EJECT UNLOADING	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

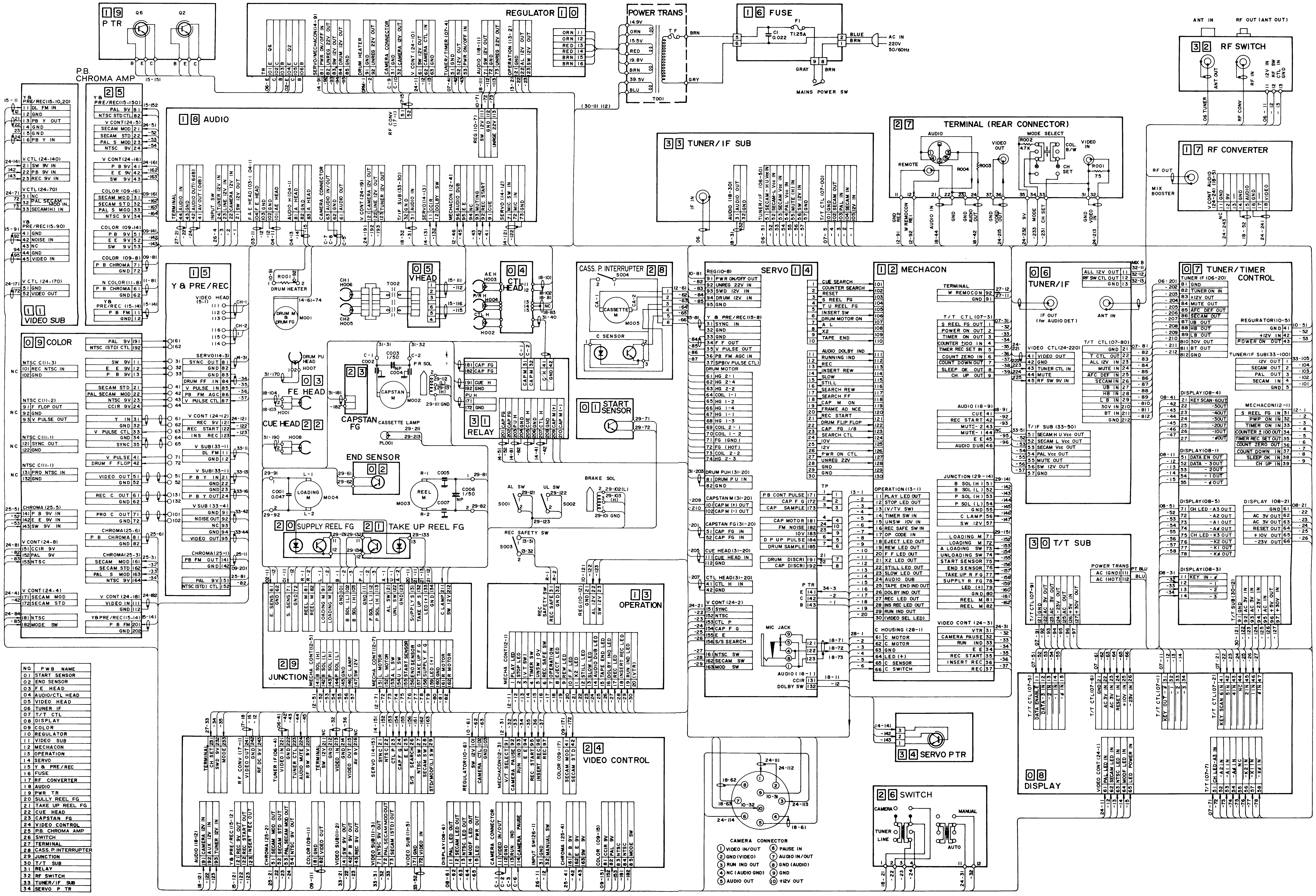
4.10 TUNER/IF BLOCK DIAGRAM


RF CONVERTER (36±4ch)
RF OUT
ANT. OUT (to TV RECEIVER)
VIDEO
RF 9V
TV
DIVIDER
RF AMP
ANT. IN (from TV ANTENNA)
17 RF SW
06 TUNER/IF
TUNER UNIT
ANT. IN
IF OUT
MB
AGC
AFC
BT LB HB UB
CF 3 40.4 MHz TRAP
AMP Q2,Q3
T1 (33.4MHz) SOUND TRAP
AMP Q6
IF FILTER SAW1, T2
SECAM-HCH S.TRAP
Q5
E.F Q1
IC 2
VIF AMP
IF AGC
AGC DET
RF AGC
RF AFC
VIF TUNING
E.F Q8
SOUND TRAP
AFC TUNING
TUNING T3
LIMITER
VIDEO DET.
RF AGC DET.
DEFEAT DRIVE
SYNC SEP. for KEYED AGC Q19~Q23
IC 3
SECAM NOISE
PAL NOISE
SECAM S.TRAP
IC 5
AFC POLARITY
V.F. IC5
E.F Q9
CF1 6.5MHz TRAP
EQ AMP Q11
SECAM SYNC LEVEL
SECAM COLOR LEVEL
LEVEL SHIFT
CF 2 5.5MHz TRAP
EQ AMP Q14,Q20
PAL COLOR LEVEL
IC 4
CTL
AMP Q16,Q18
VIDEO OUT (to VIDEO CTL. PWB)
MUTE: 12V OTHER: OPEN
SYNC DET for MUTE Q24,Q36,T7,Q35
MUTE (H) OUT (to VIDEO CTL. PWB)
Q30 H: ON
SECAM VIDEO LEVEL
PAL VIDEO LEVEL
21~211 (from/to T/T CTL. PWB)
BAND TUNING IN
30V IN
IC 1
VHF-L BAND: L
VHF-H BAND: L
UHF BAND: L
TUNER CTL: L
ALLWAYS 12V IN
SECAM: L
E. SW Q25,Q26,Q27 Q29,Q34 Q32+Q33 Low: ON
SW 12V
SECAM HB,UB Vcc
SECAM LB Vcc
PAL Vcc
AFC DEFEAT: L
MUTE: H
(from VIDEO CTL. PWB) TUNER CTL: L
33 TUNER/IF SUB
SIF TUNING Q802,T801
SIF TUNING T802
SIF AMP-1
SIF AMP-2
AUDIO DET.
AGC
IC 801
R825 SECAM AUDIO LEVEL
E.F Q801
Q807
IC 804
Q808 H: ON
AUDIO OUT (to AUDIO PWB)
AMP Q804
SAW1 T803 IF TUNING
VIF AMP
VIDEO DET.
IF AGC
IC 802
TUNING T804
5.5MHz BPF T805,CF801
SIF AMP
AUDIO DET.
IC 803
TUNING CF802
R846 PAL AUDIO LEVEL

4.11 TUNER/TIMER CONTROL AND DISPLAY BLOCK DIAGRAMS


UHF BAND OUT
VHF-H BAND OUT
VHF-L BAND OUT
BAND TUNING OUT
AUDIO MUTE OUT
AFC DEFEAT OUT
30V OUT
IC204
LPF
CH. PRESET
OFF-ON-SKIP
PRESET TUNING
TRAP
E. SW Q201
E. SW Q202
IC 212
IC202
LATCH
12 BIT BCD COUNTER
DATA DECORDER
OSC
LC OSC
IC205
16bit x 16CH MEMORY
STORE SW
12V OUT
12V IN
CP-1
10V REG
AC DET.
POWER ON IN
TIMER ON IN
TUNER ON IN
REC MODE IN
COUNTER UP/DOWN CONTROL
CH UP IN
COUNTER 0:00 OUT
COUNTER ZERO OUT
REC START OUT
POWER ON OUT
IC206 TIMER
CLOCK OSC
IC203 RESET PULSE GEN.
IC208
IC208
SP REEL PULSE IN
SHAPPER IC203
1/16 CD IC211
07 T/T CTL
XTAL OSC 400KHz
IC207 TUNER
CHANNEL UP
CTL CODE IN
CH. DATA IN
TUNER MUTE OUT
LED DRIVE
DATA ENABLE FOR CH. MEMORY
DATA ENABLE FOR DAC
D214 INDICATOR
08 DISPLAY
FUNCTION SW
CH. LED
DIMMER S406
IC401
XTAL OSC 400KHz
DISPLAY
IC209 INVERTER
INV Q203
IC208
5V SW OUT
AC 53V IN
30V REG
BACK-UP C216
-23V REG
AC3V OSC
-23V REG. OUT
30 T/T SUB

4.12 OVERALL WIRING DIAGRAM

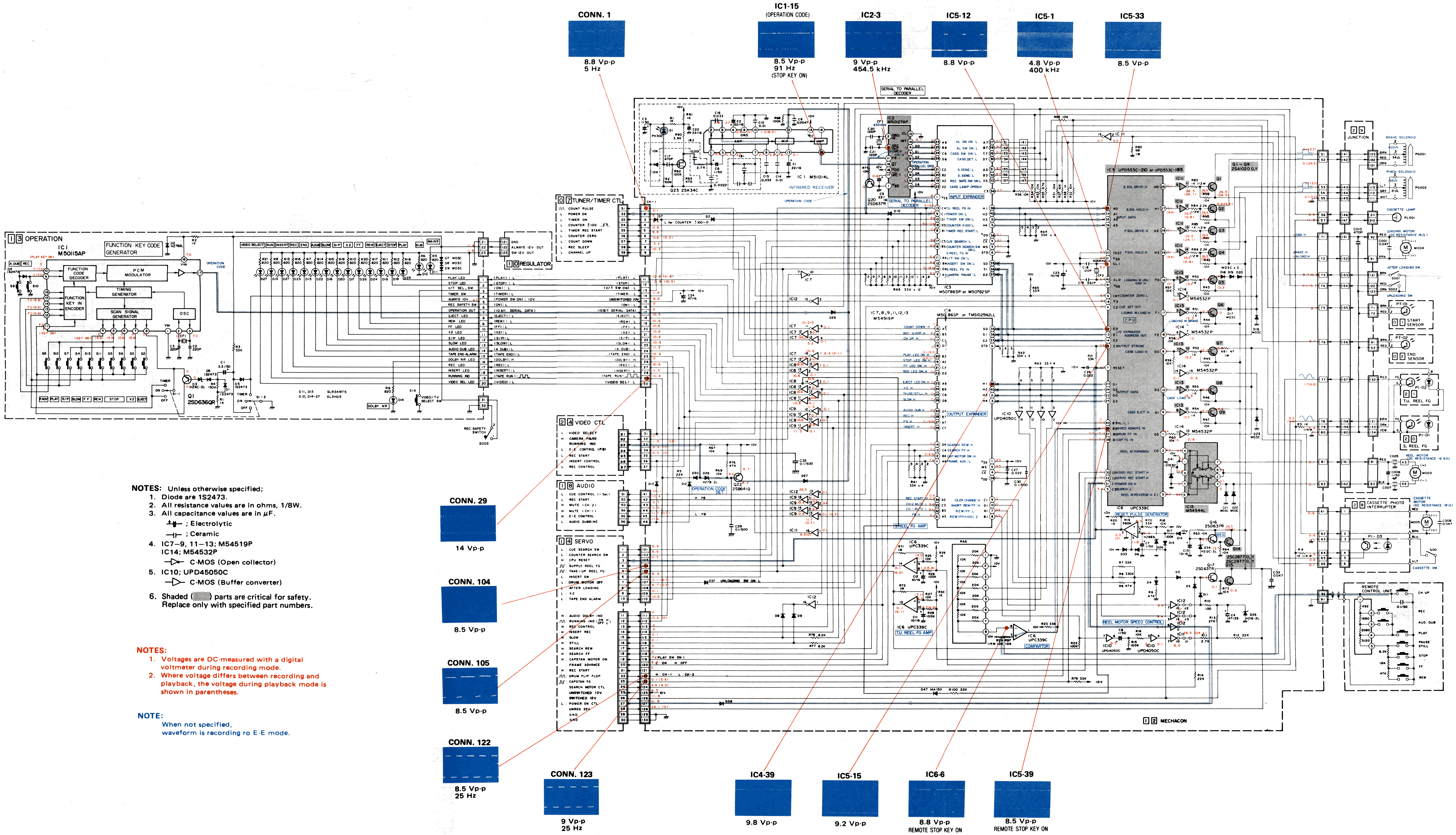


19 P TR
10 REGULATOR
POWER TRANS
16 FUSE
MAINS POWER SW
AC IN 220V 50/60Hz
32 RF SWITCH
ANT IN
RF OUT (ANT OUT)
25 P.B. CHROMA AMP
18 AUDIO
33 TUNER/IF SUB
27 TERMINAL (REAR CONNECTOR)
17 RF CONVERTER
11 VIDEO SUB
15 Y & PRE/REC
05 VHEAD
04 CTL HEAD
28 CASS. P. INTERRUPTER
14 SERVO
12 MECHACON
06 TUNER/IF
07 TUNER/TIMER CONTROL
09 COLOR
03 FE HEAD
22 CUE HEAD
23 CAPSTAN FG
31 RELAY
01 START SENSOR
02 END SENSOR
20 SUPPLY REEL FG
21 TAKE UP REEL FG
29 JUNCTION
13 OPERATION
30 T/T SUB
24 VIDEO CONTROL
34 SERVO P TR
26 SWITCH
08 DISPLAY
CAMERA CONNECTOR
① VIDEO IN/OUT
② GND (VIDEO)
③ RUN IND OUT
④ NC (AUDIO GND)
⑤ AUDIO OUT
⑥ PAUSE IN
⑦ AUDIO IN/OUT
⑧ GND (AUDIO)
⑨ GND
⑩ +12V OUT

NO.	PWB NAME
01	START SENSOR
02	END SENSOR
03	F E HEAD
04	AUDIO/CTL HEAD
05	VIDEO HEAD
06	TUNER IF
07	T/T CTL
08	DISPLAY
09	COLOR
10	REGULATOR
11	VIDEO SUB
12	MECHACON
13	OPERATION
14	SERVO
15	Y & PRE/REC
16	FUSE
17	RF CONVERTER
18	AUDIO
19	PWR TR
20	SULLY REEL FG
21	TAKE UP REEL FG
22	CUE HEAD
23	CAPSTAN FG
24	VIDEO CONTROL
25	P.B. CHROMA AMP
26	SWITCH
27	TERMINAL
28	CASS. P. INTERRUPTER
29	JUNCTION
30	T/T SUB
31	RELAY
32	RF SWITCH
33	TUNER/IF SUB
34	SERVO P TR

4.13 MECHACON AND OPERATION CIRCUITS

4.13.1 Schematic diagram

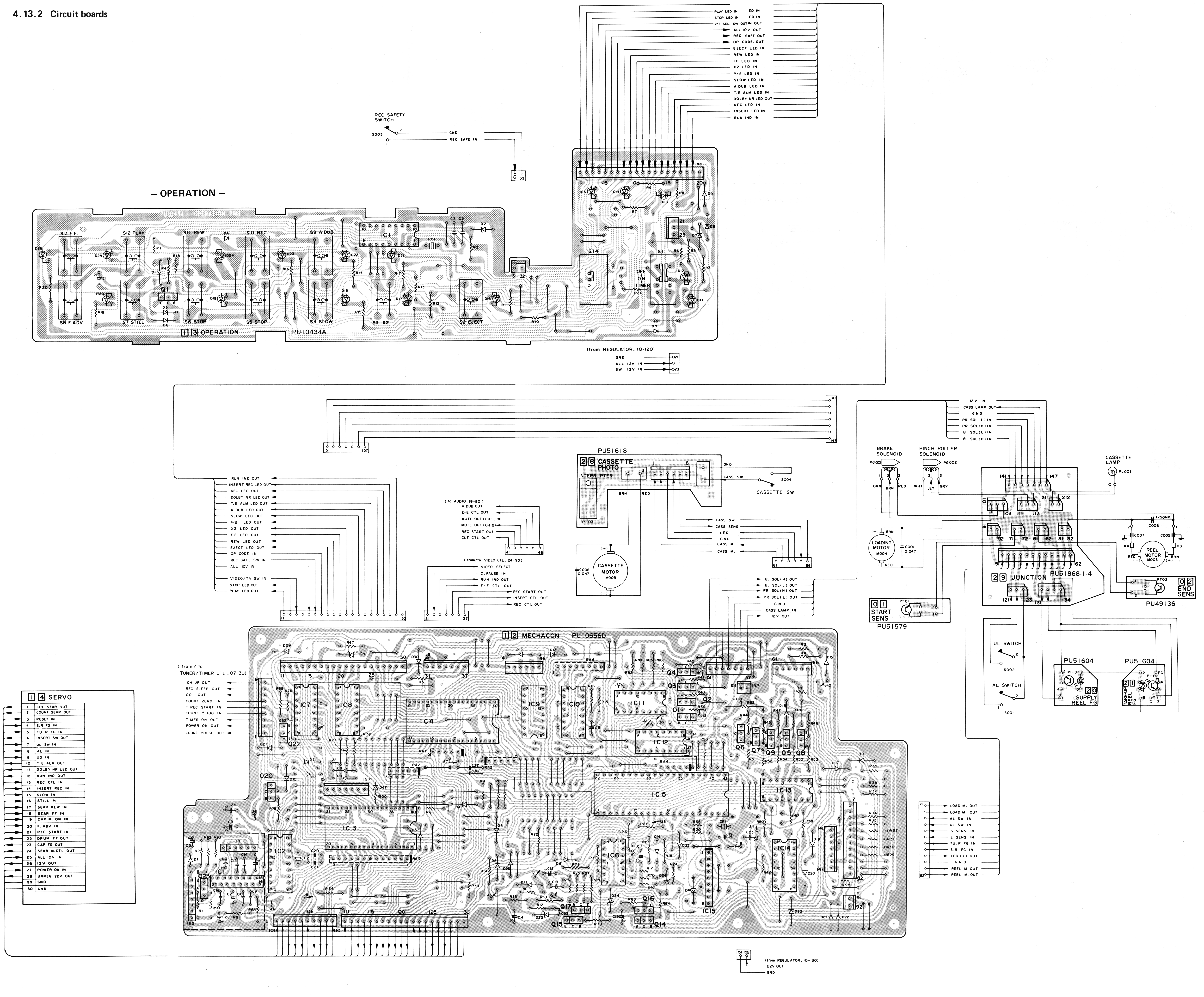

CONN. 1
8.8 Vp-p
5 Hz
IC1-15
(OPERATION CODE)
8.5 Vp-p
91 Hz
(STOP KEY ON)
IC2-3
9 Vp-p
454.5 kHz
IC5-12
8.8 Vp-p
IC5-1
4.8 Vp-p
400 kHz
IC5-33
8.5 Vp-p
CONN. 29
14 Vp-p
CONN. 104
8.5 Vp-p
CONN. 105
8.5 Vp-p
CONN. 122
8.5 Vp-p
25 Hz
CONN. 123
9 Vp-p
25 Hz
IC4-39
9.8 Vp-p
IC5-15
9.2 Vp-p
IC6-6
8.8 Vp-p
REMOTE STOP KEY ON
IC5-39
8.5 Vp-p
REMOTE STOP KEY ON
13 OPERATION
IC1
M50115AP
FUNCTION KEY CODE GENERATOR
FUNCTION CODE DECODER
PCM MODULATOR
TIMING GENERATOR
FUNCTION KEY IN ENCODER
SCAN SIGNAL GENERATOR
OSC
Q1
2SD636QR
10 REGULATOR
07 TUNER/TIMER CTL
24 VIDEO CTL
18 AUDIO
14 SERVO
12 MECHACON
IC2
M50127AP
SERIAL TO PARALLEL DECODER
IC3
M50786SP or M50782SP
INPUT EXPANDER
IC4
M50786SP or TMS1025N2LL
OUTPUT EXPANDER
IC5 UPD553C-210 or UPD553C-185
CPU
IC6 UPC339C
RESET PULSE GENERATOR
REEL MOTOR SPEED CONTROL
IC10
UPD4050C
IC15
M54544L
Q16
2SD637R
Q17
2SD637R
Q1 ~ Q9
2SA1020,O,Y
IC1 M51014L
INFRARED RECEIVER
Q23 2SK34C
JUNCTION
BRAKE SOLENOID
PINCH SOLENOID
CASSETTE LAMP
LOADING MOTOR
START SENSOR
END SENSOR
T.U. REEL FG
S. REEL FG
REEL MOTOR
CASSETTE PHOTO INTERRUPTER
CASSETTE MOTOR
CASSETTE SW
REMOTE CONTROL UNIT

NOTES: Unless otherwise specified;
1. Diode are 1S2473.
2. All resistance values are in ohms, 1/8W.
3. All capacitance values are in μF.
   - ; Electrolytic
   - ; Ceramic
4. IC7–9, 11–13; M54519P
   IC14; M54532P
   C-MOS (Open collector)
5. IC10; UPD45050C
   C-MOS (Buffer converter)
6. Shaded (▨) parts are critical for safety.
   Replace only with specified part numbers.

NOTES:
1. Voltages are DC-measured with a digital voltmeter during recording mode.
2. Where voltage differs between recording and playback, the voltage during playback mode is shown in parentheses.

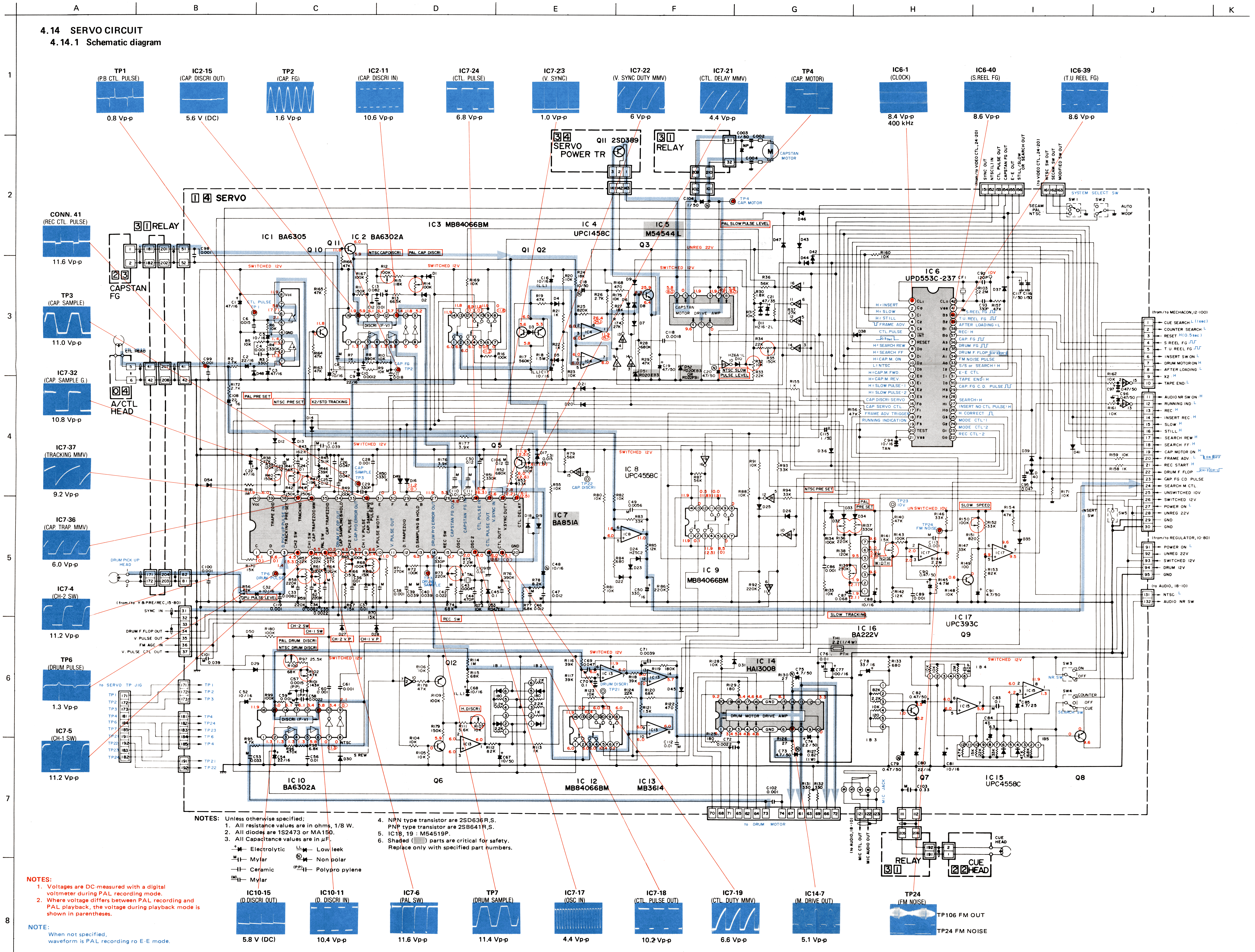
NOTE:
When not specified,
waveform is recording ro E-E mode.

4.13.2 Circuit boards


PLAY LED IN
STOP LED IN
V/T SEL, SW OUT
ALL 10V OUT
REC SAFE OUT
OP CODE OUT
EJECT LED IN
REW LED IN
FF LED IN
X2 LED IN
P/S LED IN
SLOW LED IN
A.DUB LED IN
T.E ALM LED IN
DOLBY NR LED OUT
REC LED IN
INSERT LED IN
RUN IND IN
REC SAFETY SWITCH
S003
GND
REC SAFE IN
31 32
– OPERATION –
PU10434 OPERATION PWB
S13 F.F.
S12 PLAY
S11 REW
S10 REC
S9 A.DUB
S8 F.ADV.
S7 STILL
S6 STOP
S5 STOP
S4 SLOW
S3 X2
S2 EJECT
S14
S1
OFF
ON
TIMER
IC1
Q1
1 3 OPERATION
PU10434A
(from REGULATOR, 10-120)
GND
ALL 12V IN
SW 12V IN
21
23
RUN IND OUT
INSERT REC LED OUT
REC LED OUT
DOLBY NR LED OUT
T.E ALM LED OUT
A.DUB LED OUT
SLOW LED OUT
P/S LED OUT
X2 LED OUT
FF LED OUT
REW LED OUT
EJECT LED OUT
OP CODE IN
REC SAFE SW IN
ALL 10V IN
VIDEO/TV SW IN
STOP LED OUT
PLAY LED OUT
11
30
151
157
141
147
(to AUDIO, 18-90)
A DUB OUT
E-E CTL OUT
MUTE OUT (CH-1)
MUTE OUT (CH-2)
REC START OUT
CUE CTL OUT
41
46
(from/to VIDEO CTL, 24-90)
VIDEO SELECT
C. PAUSE IN
RUN IND OUT
E-E CTL. OUT
REC START OUT
INSERT CTL OUT
REC CTL OUT
31
37
PU51618
2 8 CASSETTE PHOTO
INTERRUPTER
P1-03
BRN
RED
GND
CASS. SW
S004
CASSETTE SW
CASS SW
CASS SENS
LED
GND
CASS M.
CASS M.
61
66
CASSETTE MOTOR
M005
C008
0.047
(+)
(–)
B. SOL(H) OUT
B. SOL(L) OUT
PR SOL(H) OUT
PR SOL(L) OUT
GND
CASS LAMP IN
12V OUT
12V IN
CASS LAMP OUT
GND
PR SOL(L) IN
PR SOL(H) IN
B. SOL(L) IN
B. SOL(H) IN
BRAKE SOLENOID
PG001
ORN
BRN
RED
PINCH ROLLER SOLENOID
PG002
WHT
VLT
GRY
CASSETTE LAMP
PL001
LOADING MOTOR
M004
BRN
RED
C001
0.047
REEL MOTOR
M003
C005
C006
C007
1/50NP
K3
K4
141
147
101
103
111
113
211
212
91
92
71
72
61
62
81
82
151
162
2 9 JUNCTION
PU51868-1-4
121
123
131
134
0 2 END SENS
PT02
PU49136
0 1 START SENS
PT01
PU51579
UL SWITCH
S002
AL SWITCH
S001
PU51604
P1-01
2 0 SUPPLY REEL FG
PU51604
P1-02
2 1 TAKE-UP REEL FG
FG
1 2 MECHACON
PU10656D
IC1
IC2
IC3
IC4
IC5
IC6
IC7
IC8
IC9
IC10
IC11
IC12
IC13
IC14
IC15
(from / to TUNER/TIMER CTL, 07-30)
CH UP OUT
REC SLEEP OUT
CD OUT
COUNT ZERO IN
T.REC START IN
COUNT ± 100 IN
TIMER ON OUT
POWER ON OUT
COUNT PULSE OUT
1 4 SERVO
1 CUE SEAR OUT
2 COUNT SEAR OUT
3 RESET IN
4 S.R FG IN
5 TU. R FG IN
6 INSERT SW OUT
7 UL SW IN
8 AL IN
9 X2 IN
10 T.E. ALM OUT
11 DOLBY NR LED OUT
12 RUN IND OUT
13 REC CTL IN
14 INSERT REC IN
15 SLOW IN
16 STILL IN
17 SEAR REW IN
18 SEAR FF IN
19 CAP M. ON IN
20 F. ADV IN
21 REC START IN
22 DRUM FF OUT
23 CAP FG OUT
24 SEAR M.CTL OUT
25 ALL 10V IN
26 12V OUT
27 POWER ON IN
28 UNREG 22V OUT
29 GND
30 GND
71
LOAD M. OUT
LOAD M. OUT
AL SW IN
UL SW IN
S.SENS IN
E.SENS IN
TU.R.FG IN
S.R.FG IN
LED (+) OUT
GND
REEL M. OUT
REEL M. OUT
82
101
106
110
111
115
120
125
130
151 152
(from REGULATOR, 10-130)
22V OUT
GND

4.14 SERVO CIRCUIT

4.14.1 Schematic diagram



TP1 (P.B CTL PULSE) 0.8 Vp-p
IC2-15 (CAP. DISCRI OUT) 5.6 V (DC)
TP2 (CAP. FG) 1.6 Vp-p
IC2-11 (CAP. DISCRI IN) 10.6 Vp-p
IC7-24 (CTL. PULSE) 6.8 Vp-p
IC7-23 (V. SYNC) 1.0 Vp-p
IC7-22 (V. SYNC DUTY MMV) 6 Vp-p
IC7-21 (CTL. DELAY MMV) 4.4 Vp-p
TP4 (CAP. MOTOR)
IC6-1 (CLOCK) 8.4 Vp-p 400 kHz
IC6-40 (S.REEL FG) 8.6 Vp-p
IC6-39 (T.U REEL FG) 8.6 Vp-p
CONN. 41 (REC CTL. PULSE) 11.6 Vp-p
TP3 (CAP. SAMPLE) 11.0 Vp-p
IC7-32 (CAP. SAMPLE G.) 10.8 Vp-p
IC7-37 (TRACKING MMV) 9.2 Vp-p
IC7-36 (CAP. TRAP. MMV) 6.0 Vp-p
IC7-4 (CH-2 SW) 11.2 Vp-p
TP6 (DRUM PULSE) 1.3 Vp-p
IC7-5 (CH-1 SW) 11.2 Vp-p
IC10-15 (D.DISCRI OUT) 5.8 V (DC)
IC10-11 (D. DISCRI IN) 10.4 Vp-p
IC7-6 (PAL SW) 11.6 Vp-p
TP7 (DRUM SAMPLE) 11.4 Vp-p
IC7-17 (OSC IN) 4.4 Vp-p
IC7-18 (CTL. PULSE OUT) 10.2 Vp-p
IC7-19 (CTL. DUTY MMV) 6.6 Vp-p
IC14-7 (M. DRIVE OUT) 5.1 Vp-p
TP24 (FM NOISE)
TP106 FM OUT
TP24 FM NOISE
14 SERVO
34 SERVO POWER TR
31 RELAY
23 CAPSTAN FG
04 A/CTL HEAD
22 CUE HEAD
IC1 BA6305
IC2 BA6302A
IC3 MB84066BM
IC4 UPC1458C
IC5 M54544L
IC6 UPD553C-237
IC7 BA851A
IC8 UPC4558C
IC9 MB84066BM
IC10 BA6302A
IC12 MB84066BM
IC13 MB3614
IC14 HA13008
IC15 UPC4558C
IC16 BA222V
IC17 UPC393C
Q11 2SD389
CAPSTAN MOTOR DRIVE AMP
DRUM MOTOR DRIVE AMP
SWITCHED 12V
to DRUM MOTOR
(from/to MECHACON, 12-100)
(from/to REGULATOR, 10-80)
(to AUDIO, 18-10)

NOTES: Unless otherwise specified;
1. All resistance values are in ohms, 1/8 W.
2. All diodes are 1S2473 or MA150.
3. All Capacitance values are in μF.
Electrolytic
Mylar
Ceramic
Mylar
Low leek
Non polar
Polypro pylene
4. NPN type transistor are 2SD636R,S.
PNP type transistor are 2SB641R,S.
5. IC18, 19 : M54519P.
6. Shaded ( ) parts are critical for safety.
Replace only with specified part numbers.

NOTES:
1. Voltages are DC-measured with a digital voltmeter during PAL recording mode.
2. Where voltage differs between PAL recording and PAL playback, the voltage during playback mode is shown in parentheses.

NOTE:
When not specified, waveform is PAL recording ro E-E mode.

4.14.2 Circuit boards

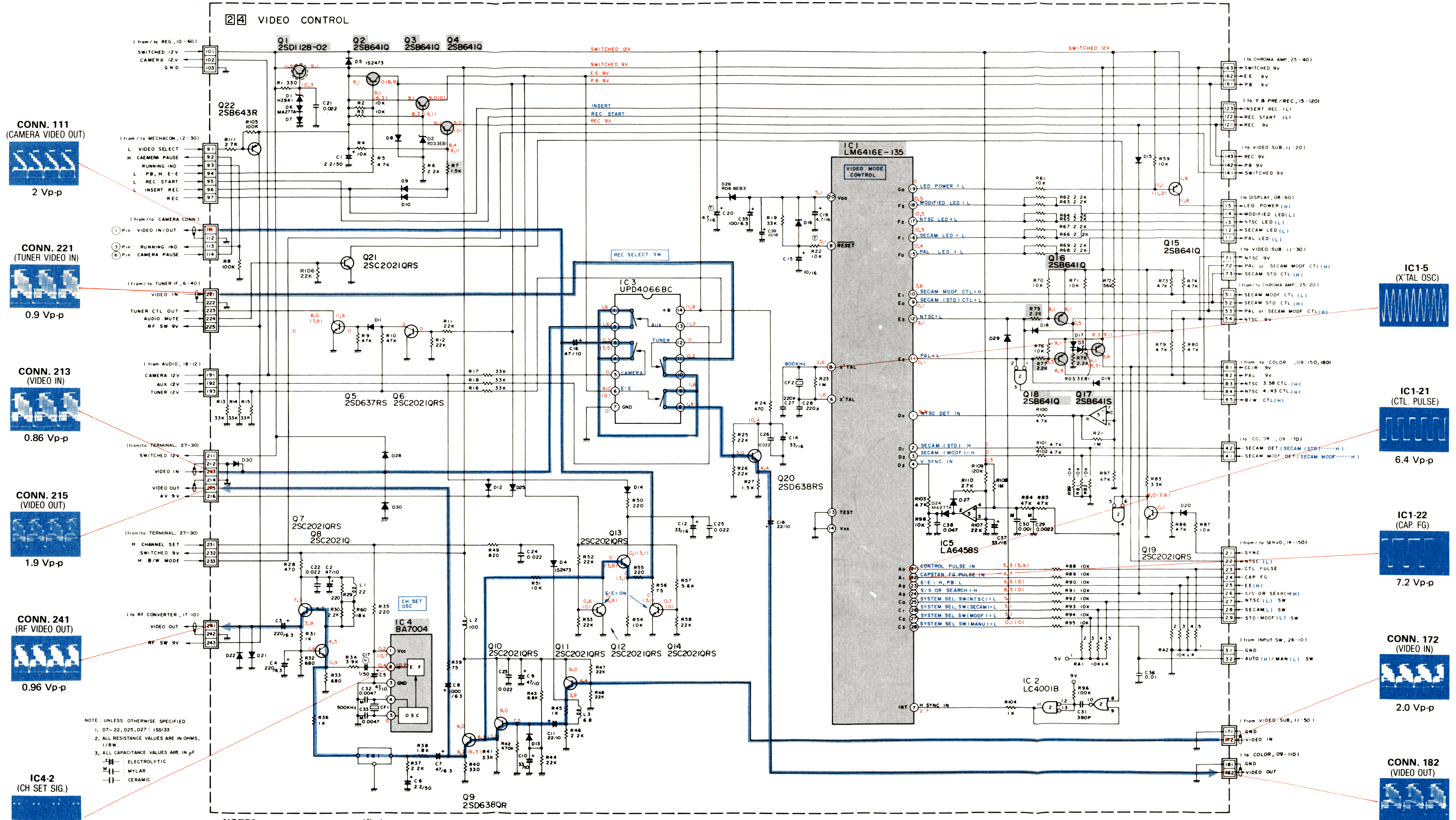
– IC7 BA851A –
CAP PHASE DET. ERROR OUT
CAP. FG or CTL. PULSE OUT
CAP. FG IN
CTL. PULSE IN
V. SYNC IN
Vcc
PRE SET MMV
TRACK MMV
PB/INSERT
REC/ASS'Y
TRAPEZOID DUTY MMV
REC
PB
TRAPE-ZOID
CAP. SAMP. & HOLD
MMV & P. GEN
ASS'Y INSERT REC/PB
SEARCH
COUNT DOWN
ASS'Y ON
PB/INSERT
1/2 CD
MODE SELECT
CTL DELAY MMV
RESET PULSE SELECT
SEARCH
ASS'Y
NORMAL
INSERT
CTL DUTY MMV
SW PHASE MMV 1
SW PHASE MMV 2
70° DELAY MMV
PAL/SECAM
NTSC
FLIP FLOP
V PULSE POS MMV
V PULSE WIDTH MMV
4H OFF
X2/SLOW/SEARCH
D. SAMPLE & HOLD
REC PHASE
32KHz OSC
RESET
GND
DRUM PULSE IN
DRUM F. FLOP OUT
V. PULSE OUT
DRUM PHASE DET. ERROR OUT
REC CTL. PULSE OUT
CAPSTAN MOTOR M002
CAPSTAN FG
CUE HEAD
CUE HEAD H008
CAP M OUT
CTL HEAD
CUE HEAD IN
CAP FG IN
A/CTL HEAD
CTL HEAD H005
RELAY
PU51866-1-3
CAP M
PU HEAD
D PU HEAD IN
DRUM PICK UP HEAD H007
DRUM MOTOR
DRUM P.U HEAD
NTSC PRE SET
PAL PRE SET
CH-2 SW
CAP FG
CH-1 SW
D.P.U PULSE LEVEL
CH-2 V.P
(from/to VIDEO(Y) 15-80)
S.P.B OUT
AGC
V.PULSE OUT
F.F OUT
GND
SYNC IN
REC SW
(from/to REG 10-80)
POWER ON/OFF
UNRGE 22V
12 V
DRUM 12V
PAL SLOW PULSE LEVEL
DRUM SAMPLE TP7
DRUM P.PU PULSE TP6
10V TP23
FM NOISE TP24
CAP MOTOR TP4
NTSC SLOW PULSE LEVEL
NTSC DRUM DISCRI
PAL DRUM DISCRI
NTSC PRE SET
PAL PRE SET
CAP.M.(+)
CAP.M (–)
NOISE WIDTH
H DISCRI
NTSC CAP DISCRI
PAL CAP DISCRI
IC 7
IC 6
MIC JACK
SLOW SPEED
SLOW TRACKING
X2/STD TRACKING
R150
R139
R44
R68
TP21 DRUM DISCRI
TP22 CAP DISCRI
(from/to VIDEO CTL,24-20)
SYNC OUT
NTSC(L) IN
CTL P.OUT
CAP. FG OUT
E.E OUT
S/S, SEARCH OUT
(to VIDEO CTL,24-20)
MIDIFIED SW OUT
SECAM SW OUT
NTSC SW OUT
CH-1 V.P
14 SERVO PWB ASS'Y PU10587D
UNREG 22V OUT
SERVO TEST POINTS
12 MECHACON

from 144	TP 1	PB CONTROL PULSE	1
from 162	TP 2	CAP FG	
from 151	TP 3	CAP SAMPLE	
from 161	TP 4	CAP MOTOR	
from 141	TP 6	DRUM PULSE	5
from 142	TP 7	DRUM SAMPLE	
from 143	TP 21	DRUM DISCRI	
from 153	TP 22	CAP. DISCRI	
from 152	TP 23	10V	
from 154	TP 24	FM NOISE	10

130	GND
129	GND
128	UNREG 22V IN
127	POWER ON OUT
126	12V IN
125	10V OUT
124	SEARCH M.CTL IN
123	CAP FG IN
122	DRUM FF IN
121	REC START OUT
120	F ADV OUT
119	CAP M ON OUT
118	SEARCH FF OUT
117	SEARCH REW OUT
116	STILL OUT
115	SLOW OUT
114	INSERT REC OUT
113	REC CTL OUT
112	RUN IND IN
111	DOLBY NR LED
110	TE ALM IN
109	X2 OUT
108	AL OUT
107	UL SW OUT
106	INSERT SW IN
105	TU R FG OUT
104	S.R FG OUT
103	RESET OUT
102	COUNT SEARCH IN
101	CUE SEARCH IN

4.15 VIDEO CONTROL CIRCUIT

4.15.1 Schematic diagram


24 VIDEO CONTROL
Q1 2SD1128-02
Q2 2SB641Q
Q3 2SB641Q
Q4 2SB641Q
Q22 2SB643R
IC1 LM6416E-135
VIDEO MODE CONTROL
Q21 2SC2021QRS
IC3 UPD4066BC
Q5 2SD637RS
Q6 2SC2021QRS
Q15 2SB641Q
Q16 2SB641Q
Q18 2SB641Q
Q17 2SB641S
Q20 2SD638RS
Q7 2SC2021QRS
Q8 2SC2021Q
Q13 2SC2021QRS
IC5 LA6458S
Q19 2SC2021QRS
IC4 BA7004
Q10 2SC2021QRS
Q11 2SC2021QRS
Q12 2SC2021QRS
Q14 2SC2021QRS
IC2 LC4001B
Q9 2SD638QR
NOTE: UNLESS OTHERWISE SPECIFIED
1. D7~22, D25, D27: 1SS133
2. ALL RESISTANCE VALUES ARE IN OHMS, 1/8W.
3. ALL CAPACITANCE VALUES ARE IN µF
ELECTROLYTIC
MYLAR
CERAMIC
CONN. 111 (CAMERA VIDEO OUT)
2 Vp-p
CONN. 221 (TUNER VIDEO IN)
0.9 Vp-p
CONN. 213 (VIDEO IN)
0.86 Vp-p
CONN. 215 (VIDEO OUT)
1.9 Vp-p
CONN. 241 (RF VIDEO OUT)
0.96 Vp-p
IC4-2 (CH SET SIG.)
2.2 Vp-p
IC1-5 (X'TAL OSC)
IC1-21 (CTL. PULSE)
6.4 Vp-p
IC1-22 (CAP. FG)
7.2 Vp-p
CONN. 172 (VIDEO IN)
2.0 Vp-p
CONN. 182 (VIDEO OUT)
0.94 Vp-p

NOTES: Unless otherwise specified.

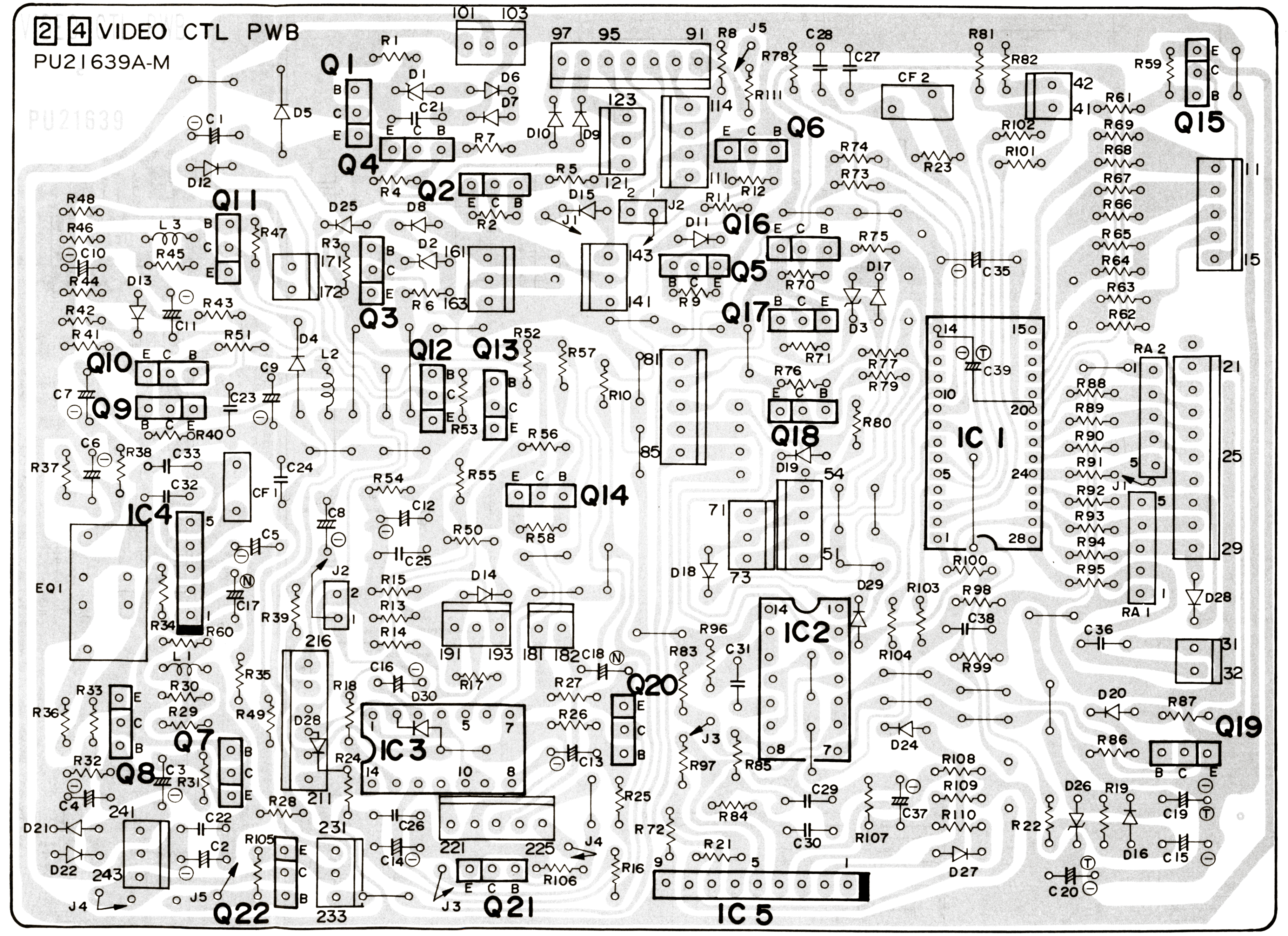
1. D7–22, D25, D27 : 1SS133.
2. All resistance values are in ohms. (1/8 W)
3. All inductance values are in µH.
4. All capacitance values are in µF.
5. Shaded ( ) parts are critical for safety. Replace only with specified part numbers.

NOTES:

1. Voltages are DC measured with a digital voltmeter during PAL recording mode.
2. Where voltage differs between PAL recording and PAL playback, the voltage during playback mode is shown in parentheses.

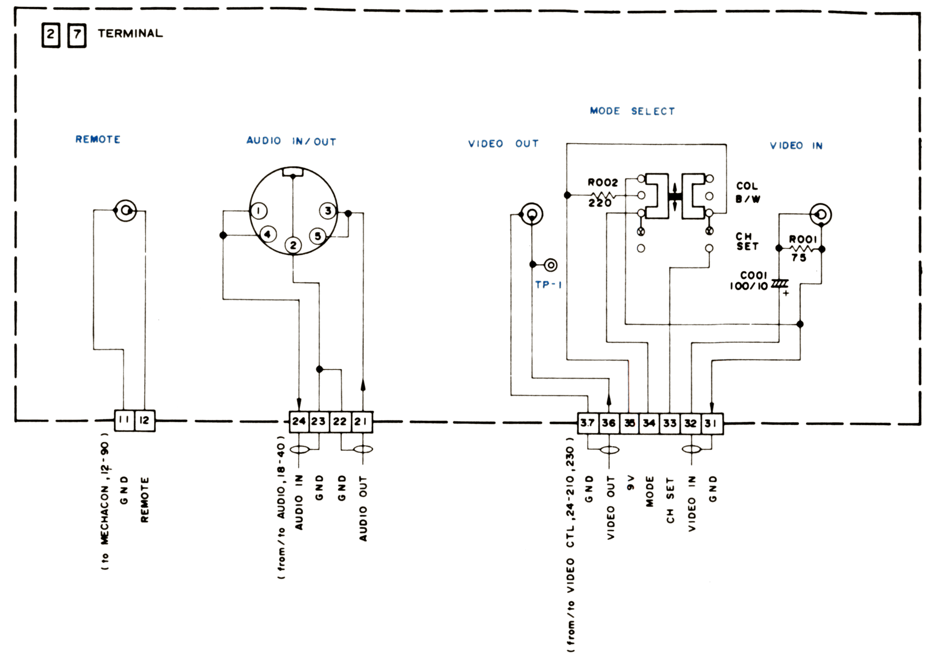
NOTE:
When not specified, waveform is PAL recording ro E-E mode.

4.15.2 Circuit board

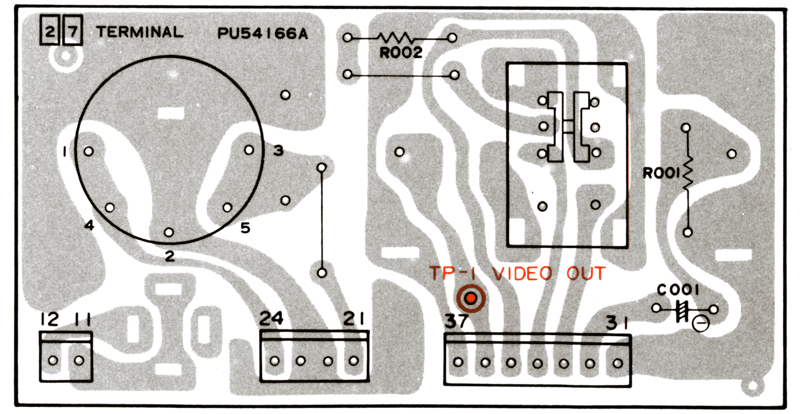

24 VIDEO CTL PWB
PU21639A-M
IC1
IC2
IC3
IC4
IC5
Q1
Q2
Q3
Q4
Q5
Q6
Q7
Q8
Q9
Q10
Q11
Q12
Q13
Q14
Q15
Q16
Q17
Q18
Q19
Q20
Q21
Q22

4.16 TERMINAL CIRCUIT

4.16.1 Schematic diagram

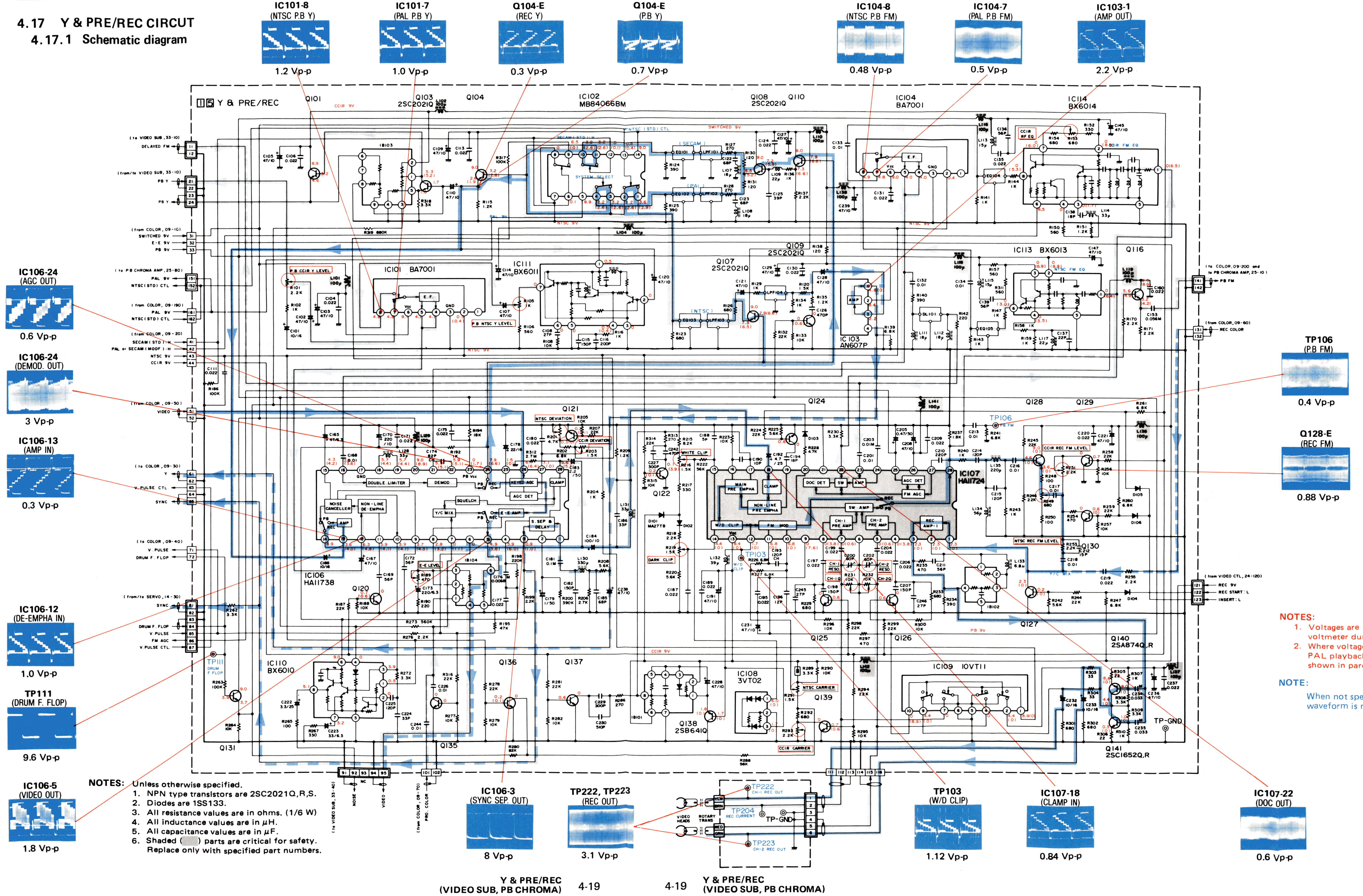

27 TERMINAL
REMOTE
AUDIO IN/OUT
VIDEO OUT
MODE SELECT
VIDEO IN

4.16.2 Circuit board


27 TERMINAL PU54166A
R002
TP-1 VIDEO OUT
C001

4.17 Y & PRE/REC CIRCUIT

4.17.1 Schematic diagram


IC101-8 (NTSC P.B Y) 1.2 Vp-p
IC101-7 (PAL P.B Y) 1.0 Vp-p
Q104-E (REC Y) 0.3 Vp-p
Q104-E (P.B Y) 0.7 Vp-p
IC104-8 (NTSC P.B FM) 0.48 Vp-p
IC104-7 (PAL P.B FM) 0.5 Vp-p
IC103-1 (AMP OUT) 2.2 Vp-p
IC106-24 (AGC OUT) 0.6 Vp-p
IC106-24 (DEMOD. OUT) 3 Vp-p
IC106-13 (AMP IN) 0.3 Vp-p
IC106-12 (DE-EMPHA IN) 1.0 Vp-p
TP111 (DRUM F. FLOP) 9.6 Vp-p
IC106-5 (VIDEO OUT) 1.8 Vp-p
TP106 (P.B FM) 0.4 Vp-p
Q128-E (REC FM) 0.88 Vp-p
IC107-22 (DOC OUT) 0.6 Vp-p
IC106-3 (SYNC SEP. OUT) 8 Vp-p
TP222, TP223 (REC OUT) 3.1 Vp-p
TP103 (W/D CLIP) 1.12 Vp-p
IC107-18 (CLAMP IN) 0.84 Vp-p
Y & PRE/REC
Q101
Q103 2SC2021Q
Q104
IC102 MB84066BM
Q108 2SC2021Q
Q110
IC104 BA7001
IC114 BX6014
IC101 BA7001
IC111 BX6011
Q107 2SC2021Q
Q109 2SC2021Q
IC103 AN6071P
IC113 BX6013
Q116
Q121
Q124
Q128
Q129
IC107 HA11724
IC106 HA11738
Q120
Q122
Q123
Q125
Q126
Q127
Q130
Q140 2SA874Q,R
IC110 BX6010
Q136
Q137
IC108 3VT02
Q138 2SB641Q
Q139
IC109 10VT11
Q141 2SC1652Q,R
Q131
Q135
TP-GND
91 92 93 94 95
NC
NOISE
VIDEO
(to VIDEO SUB, 33-40)
(from VIDEO CTL, 24-120)
REC 9V
REC START : L
INSERT : L
TP222
TP204
TP223
TP-GND

NOTES: Unless otherwise specified.

1. NPN type transistors are 2SC2021Q,R,S.
2. Diodes are 1SS133.
3. All resistance values are in ohms. (1/6 W)
4. All inductance values are in μH.
5. All capacitance values are in μF.
6. Shaded (▒) parts are critical for safety. Replace only with specified part numbers.

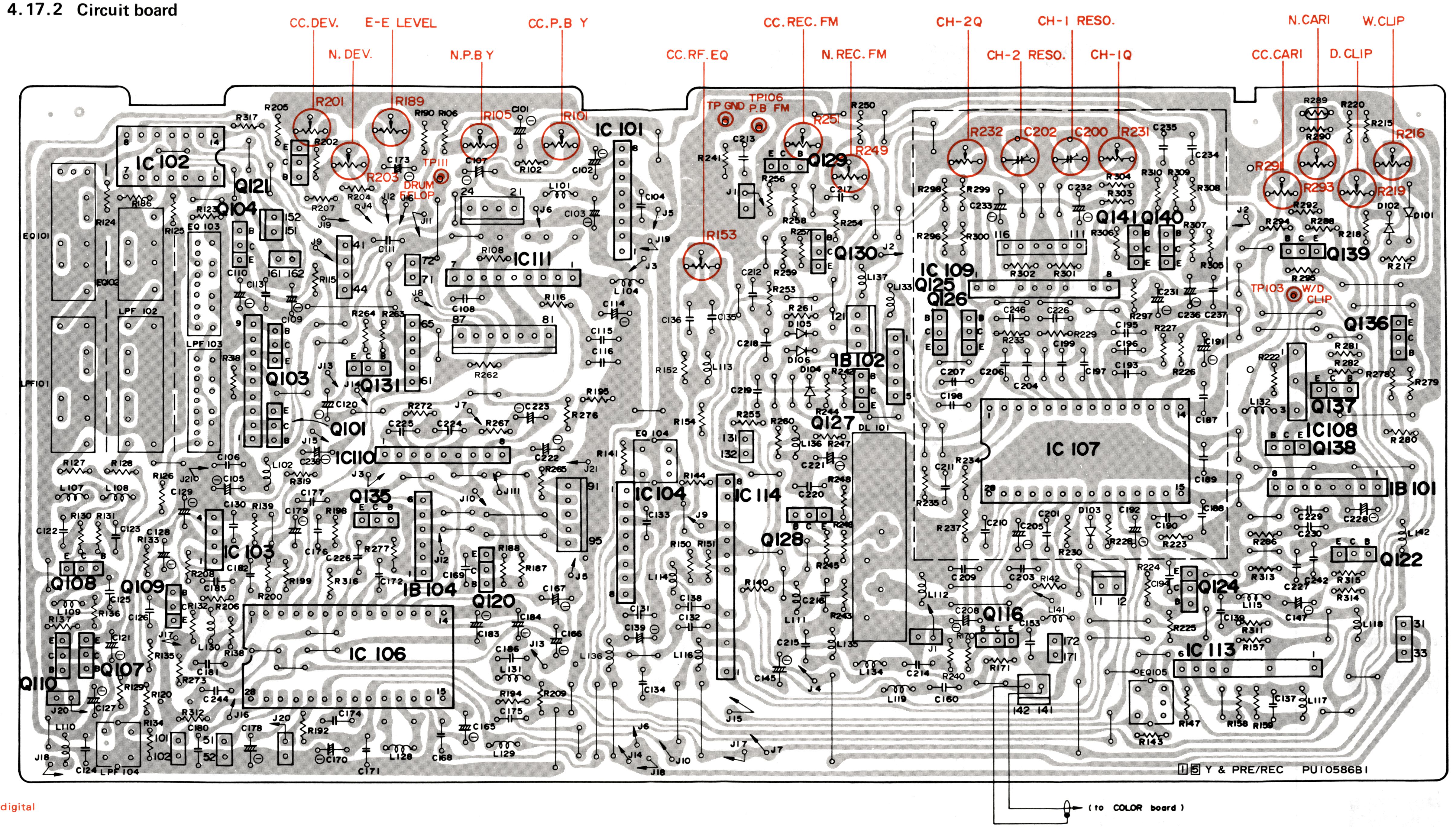
NOTES:

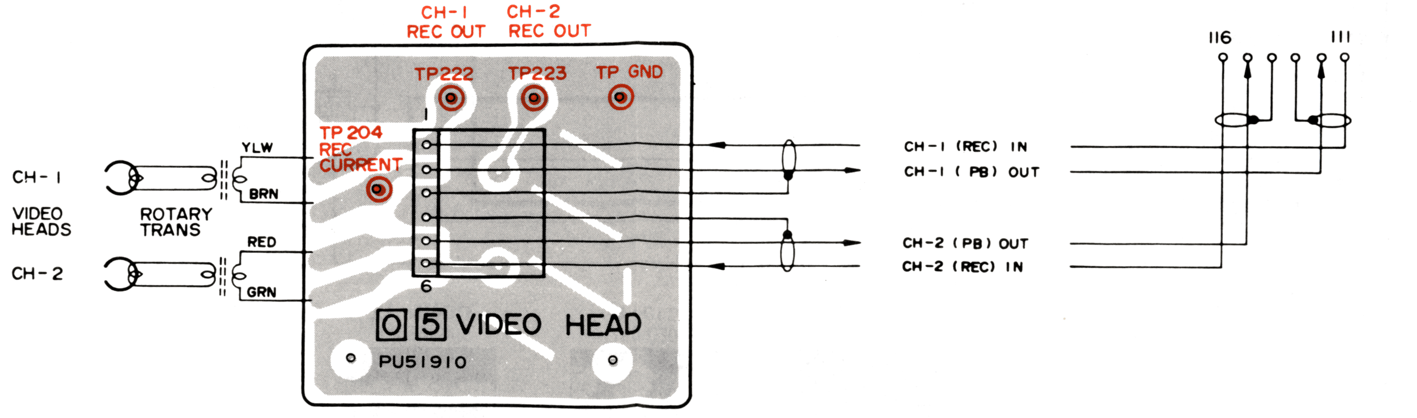
1. Voltages are DC-measured with a digital voltmeter during recording mode.
2. Where voltage differs between PAL recording and PAL playback, the voltage during playback mode is shown in parentheses.

NOTE:

When not specified,
waveform is recording or E-E mode.

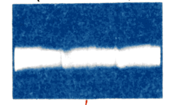
4.17.2 Circuit board

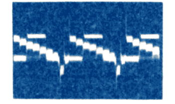

CC.DEV.
N. DEV.
E-E LEVEL
N.P.B Y
CC.P.B Y
CC.RF. EQ
TP GND
TP106 P.B FM
CC.REC. FM
N.REC. FM
CH-2 Q
CH-2 RESO.
CH-1 RESO.
CH-1 Q
CC.CARI
N.CARI
D. CLIP
W. CLIP
TP103 W/D CLIP
R201
R189
R105
R101
R153
R232
C202
C200
R231
R291
R293
R216
IC 101
IC 102
IC 103
IC 104
IC 106
IC 107
IC 108
IC 109
IC 110
IC 111
IC 113
IC 114
IB 101
IB 102
IB 104
Q101
Q103
Q104
Q107
Q108
Q109
Q110
Q116
Q120
Q121
Q122
Q124
Q125
Q126
Q127
Q128
Q129
Q130
Q131
Q135
Q136
Q137
Q138
Q139
Q140
Q141
LPF 104
J18
(to COLOR board)
Y & PRE/REC PU10586B1

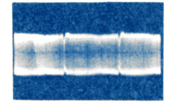

CH-1 REC OUT
CH-2 REC OUT
TP222
TP223
TP GND
TP 204 REC CURRENT
1
6
CH-1
VIDEO HEADS
CH-2
YLW
BRN
RED
GRN
ROTARY TRANS
05 VIDEO HEAD
PU51910
CH-1 (REC) IN
CH-1 (PB) OUT
CH-2 (PB) OUT
CH-2 (REC) IN
116
111

4.18 VIDEO SUB CIRCUIT

4.18.1 Schematic diagram

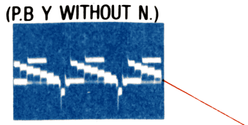

TP1
(NOISE CLIP)

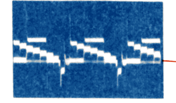

IC1-10
(DL. Y IN)
0.3 Vp-p

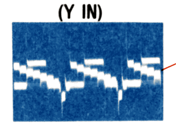

IC1-2
(DL. FM IN)
0.06 Vp-p

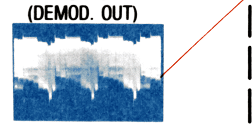
NOTES:
1. Voltages are DC-measured with a digital voltmeter during recording mode.
2. Where voltage differs between PAL recording and PAL playback, the voltage during playback mode is shown in parentheses.

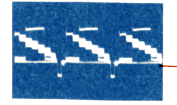
NOTE:
When not specified,
waveform is PAL recording ro E-E mode.

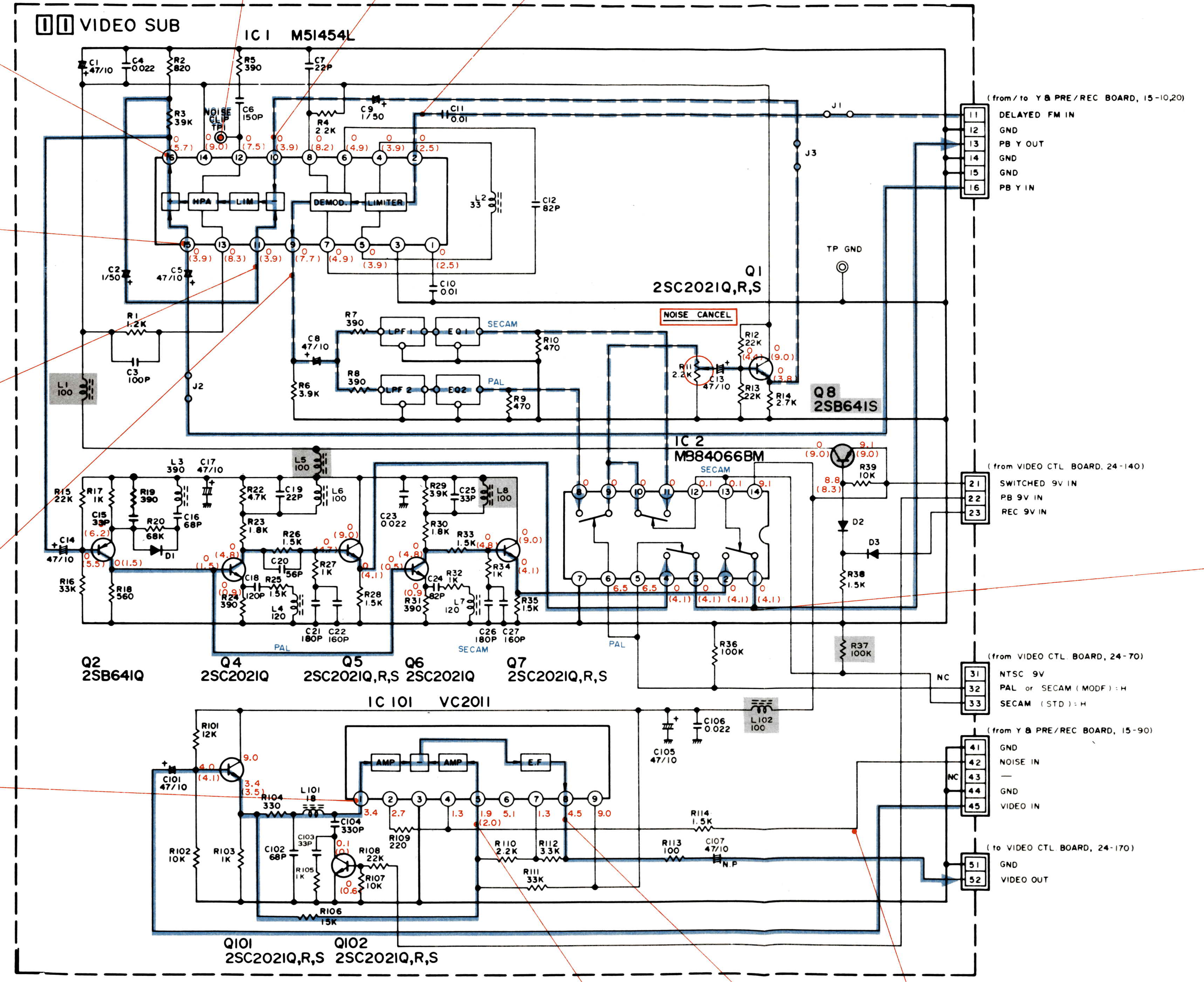

IC1-16
(P.B Y WITHOUT N.)
2 Vp-p

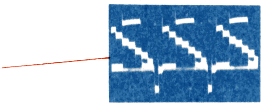

IC1-15
(P.B Y IN)
2 Vp-p


IC1-11
(Y IN)
0.3 Vp-p

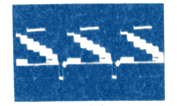

IC1-9
(DEMOD. OUT)
1.2 Vp-p

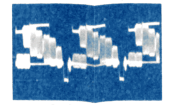

IC101-1
(EQ VIDEO IN)
1.9 Vp-p

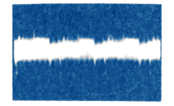

1 1 VIDEO SUB
IC1 M51454L
Q1 2SC2021Q,R,S
Q8 2SB641S
NOISE CANCEL
IC 2 MB84066BM
Q2 2SB641Q
Q4 2SC2021Q
Q5 2SC2021Q,R,S
Q6 2SC2021Q
Q7 2SC2021Q,R,S
IC 101 VC2011
Q101 2SC2021Q,R,S
Q102 2SC2021Q,R,S
TP GND
SECAM
PAL
(from/to Y & PRE/REC BOARD, 15-(10,20))
DELAYED FM IN
GND
PB Y OUT
GND
GND
PB Y IN
(from VIDEO CTL. BOARD, 24-(40))
SWITCHED 9v IN
PB 9V-IN
REC 9V IN
(from VIDEO CTL. BOARD, 24-(70))
NTSC 9V
PAL or SECAM (MOD F) H
SECAM (STD) H
(from Y & PRE/REC BOARD, 15-(90))
GND
NOISE IN
GND
VIDEO IN
(to VIDEO CTL. BOARD, 24-(70))
GND
VIDEO OUT


IC2-1
(P.B Y OUT)
2.25 Vp-p

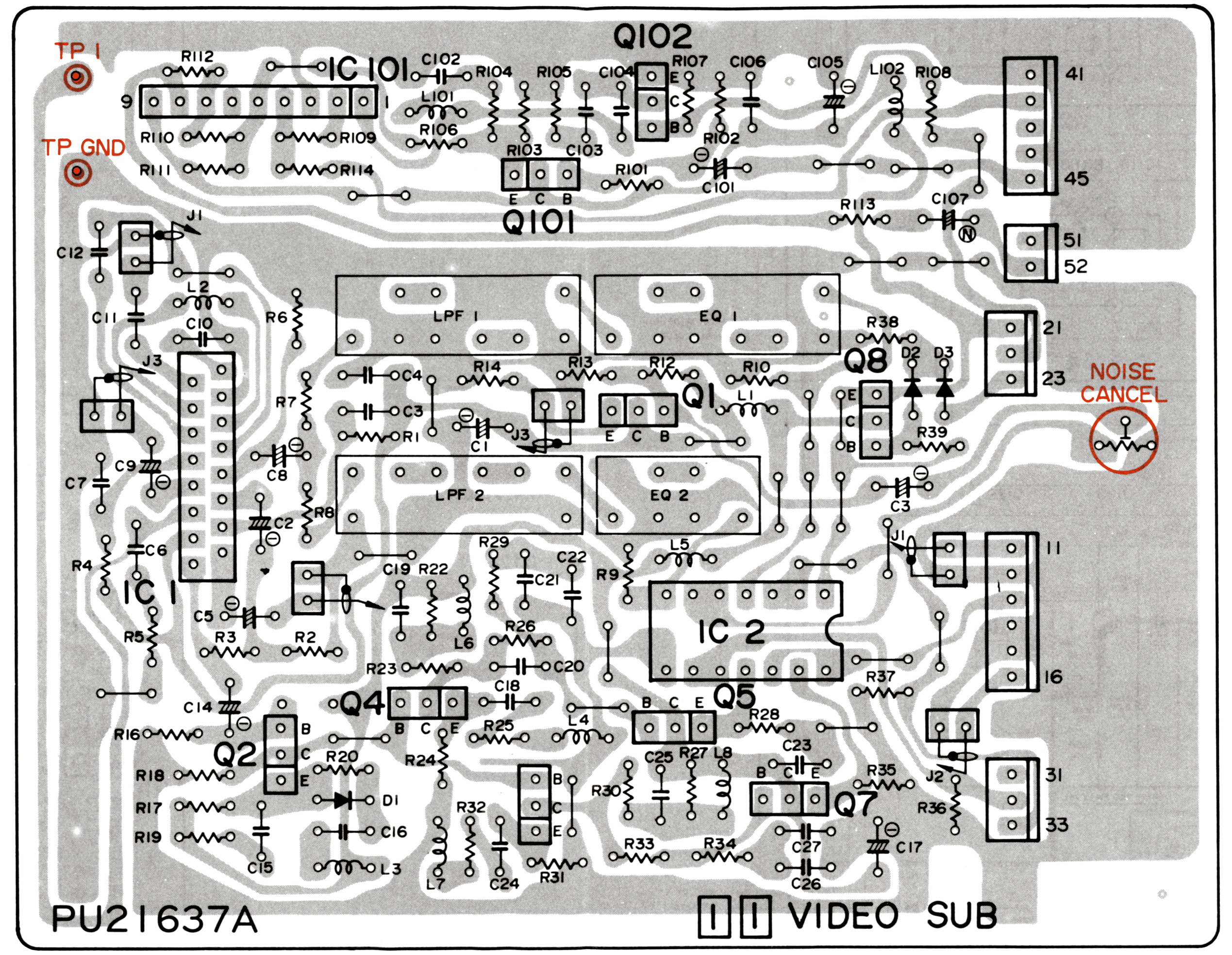
NOTES: Unless otherwise specified.
1. Diodes are 1SS133.
2. All resistance values are in ohms. (1/6 W)
3. All inductance values are in μH.
4. All capacitance values are in μF.
5. Shaded (▨) parts are critical for safety.
Replace only with specified part numbers.


IC101-5
(VIDEO IN)
0.72 Vp-p


IC101-8
(VIDEO OUT)
2.0 Vp-p

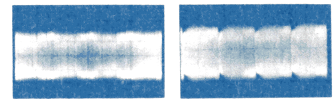

CONN. 42
(NOISE IN)

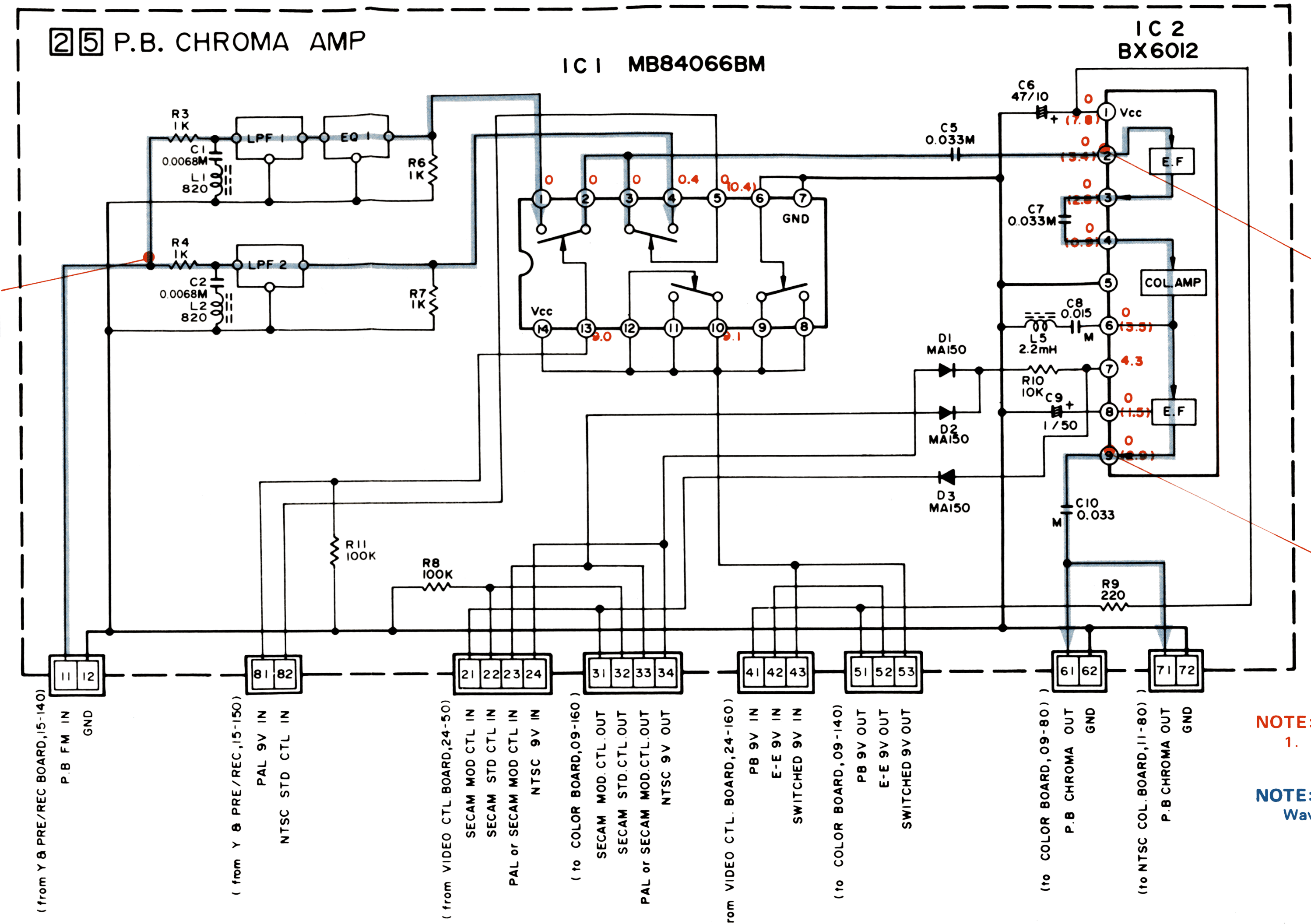
4.18.2 Circuit board

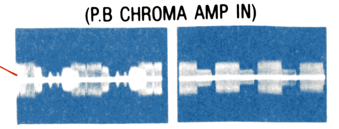

TP 1
TP GND
IC 101
Q102
Q101
IC 1
IC 2
Q8
Q1
Q4
Q2
Q5
Q7
LPF 1
LPF 2
EQ 1
EQ 2
NOISE CANCEL
PU21637A
1 1 VIDEO SUB

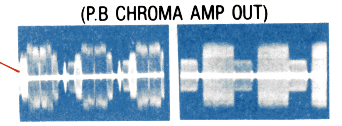
4.19 PB CHROMA AMP CIRCUIT

4.19.1 Schematic diagram


CONN. 11
(PB FM IN)
35 mVp-p


2 5 P.B. CHROMA AMP
IC 1 MB84066BM
IC 2 BX6012
LPF 1
LPF 2
EQ 1
E.F
COL.AMP
(from Y & PRE/REC BOARD,15-(40))
P.B FM IN
GND
(from Y & PRE/REC BOARD,15-(50))
PAL 9V IN
NTSC STD CTL IN
(from VIDEO CTL BOARD,24-(50))
(to COLOR BOARD,09-(60))
(from VIDEO CTL BOARD,24-(60))
(to COLOR BOARD,09-(40))
(to COLOR BOARD,09-(80))
(to NTSC COL.BOARD,11-(80))
P.B CHROMA OUT
GND

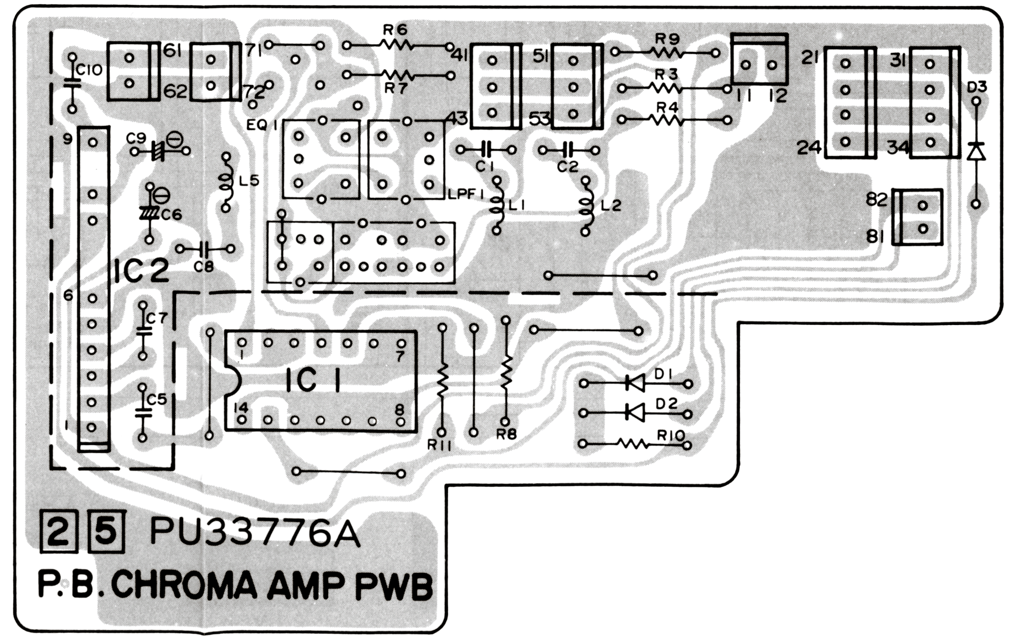

IC2-2
(P.B CHROMA AMP IN)
30 mVp-p


IC2-9
(P.B CHROMA AMP OUT)
0.6 Vp-p

NOTE:
1. Voltage are DC-measured with a digital voltmeter during PAL playback mode.

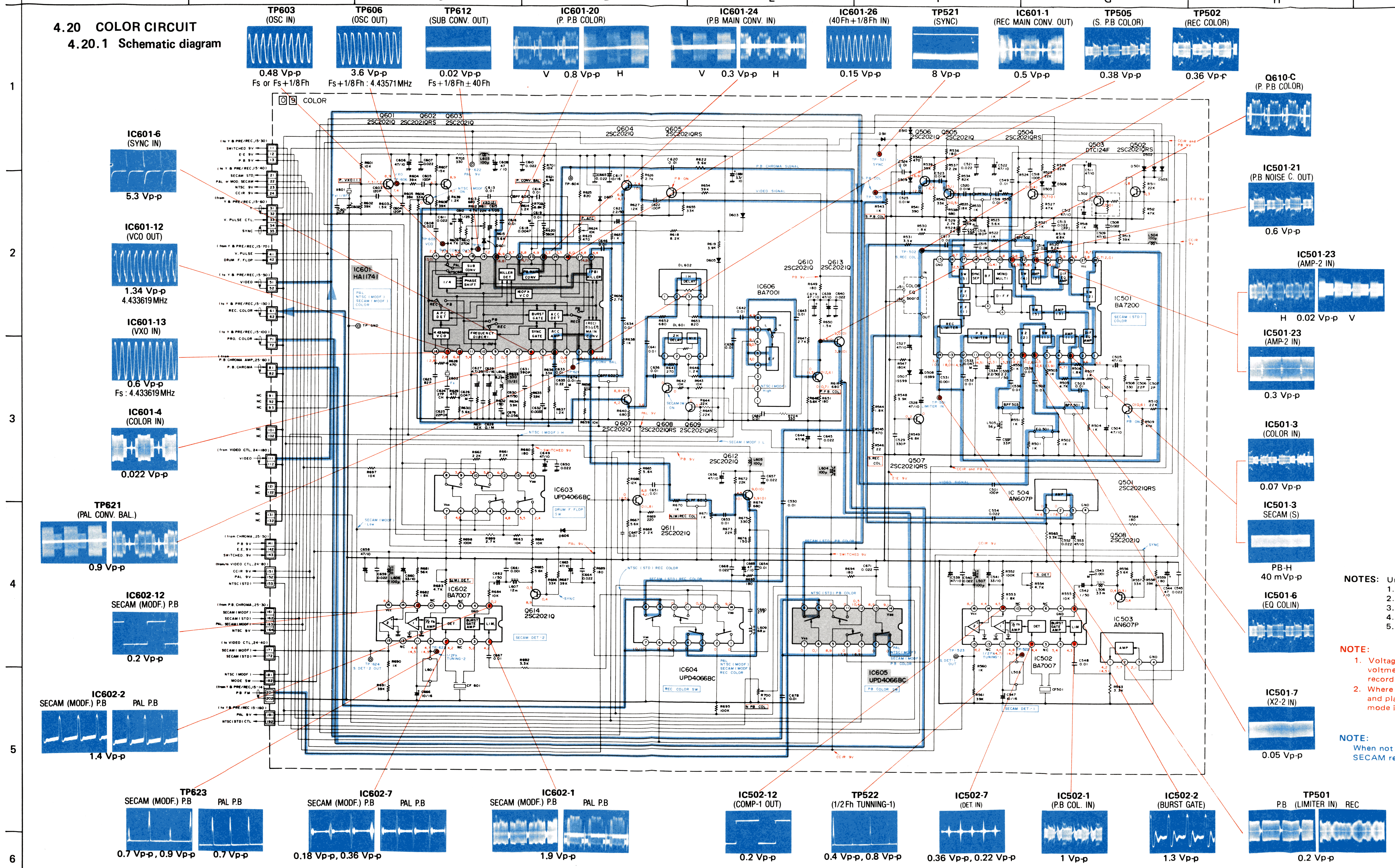
NOTE:
Waveform is PAL playback mode.

4.19.2 Circuit board


IC2
IC 1
2 5 PU33776A
P.B. CHROMA AMP PWB

4.20 COLOR CIRCUIT

4.20.1 Schematic diagram

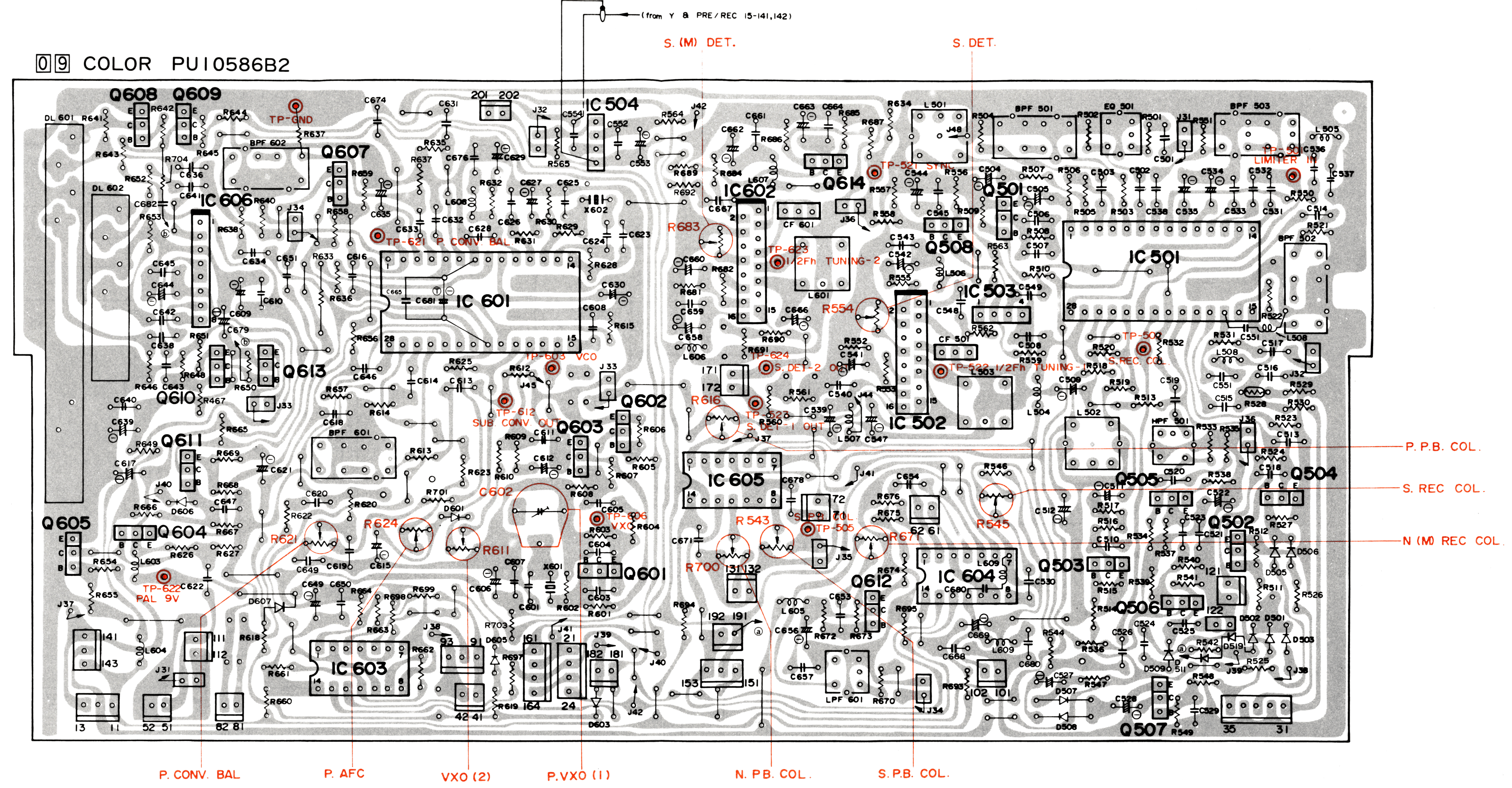

TP603 (OSC IN) 0.48 Vp-p Fs or Fs+1/8Fh
TP606 (OSC OUT) 3.6 Vp-p Fs+1/8Fh : 4.43571MHz
TP612 (SUB CONV. OUT) 0.02 Vp-p Fs+1/8Fh±40Fh
IC601-20 (P. PB COLOR) V 0.8 Vp-p H
IC601-24 (P.B MAIN CONV. IN) V 0.3 Vp-p H
IC601-26 (40Fh+1/8Fh IN) 0.15 Vp-p
TP521 (SYNC) 8 Vp-p
IC601-1 (REC MAIN CONV. OUT) 0.5 Vp-p
TP505 (S. P.B COLOR) 0.38 Vp-p
TP502 (REC COLOR) 0.36 Vp-p
Q610-C (P. P.B COLOR)
IC501-21 (P.B NOISE C. OUT) 0.6 Vp-p
IC501-23 (AMP-2 IN) H 0.02 Vp-p V
IC501-23 (AMP-2 IN) 0.3 Vp-p
IC501-3 (COLOR IN) 0.07 Vp-p
IC501-3 SECAM (S) PB-H 40 mVp-p
IC501-6 (EQ COLIN)
IC501-7 (X2-2 IN) 0.05 Vp-p
TP501 P.B (LIMITER IN) REC 0.2 Vp-p
IC502-2 (BURST GATE) 1.3 Vp-p
IC502-1 (P.B COL. IN) 1 Vp-p
IC502-7 (DET IN) 0.36 Vp-p, 0.22 Vp-p
TP522 (1/2 Fh TUNNING-1) 0.4 Vp-p, 0.8 Vp-p
IC502-12 (COMP-1 OUT) 0.2 Vp-p
IC601-1 SECAM (MODF.) P.B PAL P.B 1.9 Vp-p
IC602-7 SECAM (MODF.) P.B PAL P.B 0.18 Vp-p, 0.36 Vp-p
TP623 SECAM (MODF.) P.B PAL P.B 0.7 Vp-p, 0.9 Vp-p 0.7 Vp-p
IC602-2 SECAM (MODF.) P.B PAL P.B 1.4 Vp-p
IC602-12 SECAM (MODF.) P.B 0.2 Vp-p
TP621 (PAL CONV. BAL.) 0.9 Vp-p
IC601-4 (COLOR IN) 0.022 Vp-p
IC601-13 (VXO IN) 0.6 Vp-p Fs : 4.433619MHz
IC601-12 (VCO OUT) 1.34 Vp-p 4.433619MHz
IC601-6 (SYNC IN) 5.3 Vp-p
09 COLOR
IC601 HA11741
IC606 BA7001
IC501 BA7200
IC603 UPD4066BC
IC602 BA7007
IC604 UPD4066BC
IC605 UPD4066BC
IC504 AN607P
IC503 AN607P
IC502 BA7007
A B C D E F G H
1 2 3 4 5 6

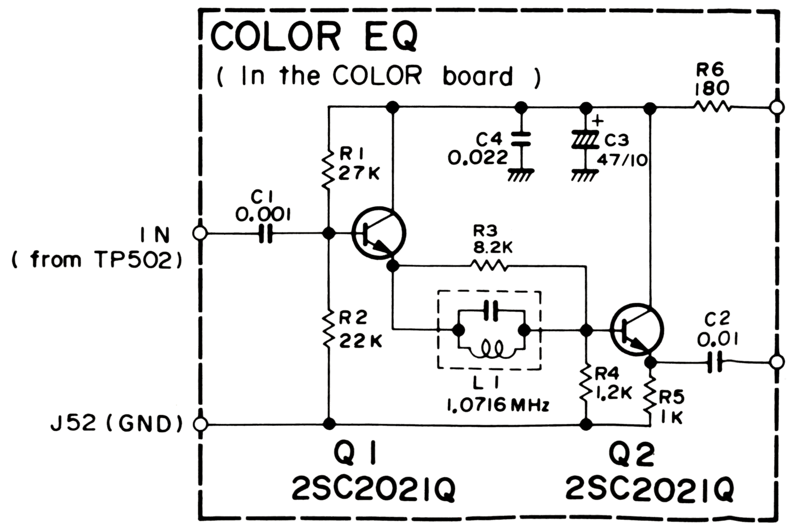
NOTES: Unless otherwise specified.
1. Diodes are 1SS133.
2. All resistance values are in ohms. (1/6 W).
3. All inductance values are in µH.
4. All capacitance values are in µF.
5. Shaded (▨) parts are critical for safety. Replace only with specified part numbers.

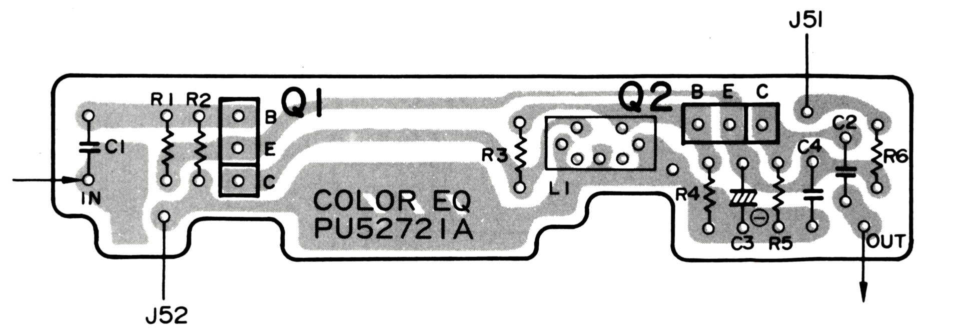
NOTE:
1. Voltages are DC-measured with a digital voltmeter during PAL or SECAM recording mode.
2. Where voltage differs between recording and playback, the voltage during playback mode is shown in parentheses.

NOTE:
When not specified, waveform is PAL or SECAM recording mode or E-E mode.

4.20.2 Circuit board

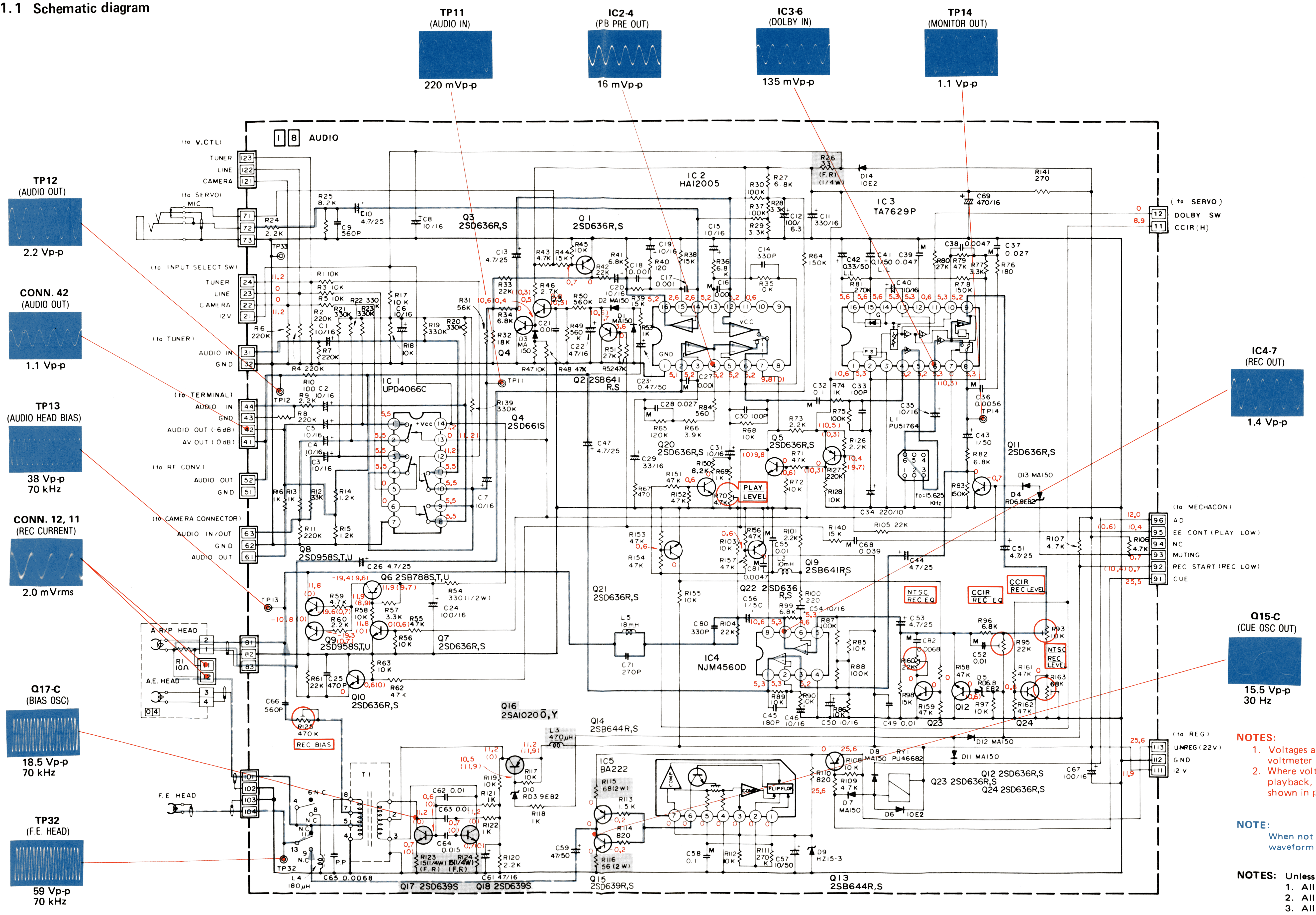

09 COLOR PU10586B2
IC601
IC602
IC603
IC604
IC605
IC606
IC501
IC502
IC503
IC504
S. (M) DET.
S. DET.
P. P.B. COL.
S. REC COL.
N (M) REC COL.
P. CONV. BAL.
P. AFC
VXO (2)
P. VXO (1)
N. P.B. COL.
S. P.B. COL.
I J K L M N O P


COLOR EQ
(In the COLOR board)
R6 180
J51 (E-E 9V)
R1 27K
C4 0.022
C3 47/10
C1 0.001
IN (from TP502)
R3 8.2K
R2 22K
L1 1.0716 MHz
R4 1.2K
R5 1K
C2 0.01
OUT (to R544)
J52 (GND)
Q1 2SC2021Q
Q2 2SC2021Q


J51
Q1
Q2
R1 R2
C1
IN
R3
B E C
C2
R6
R4
R5
COLOR EQ PU52721A
OUT
J52

4.21 AUDIO CIRCUIT

4.21.1 Schematic diagram

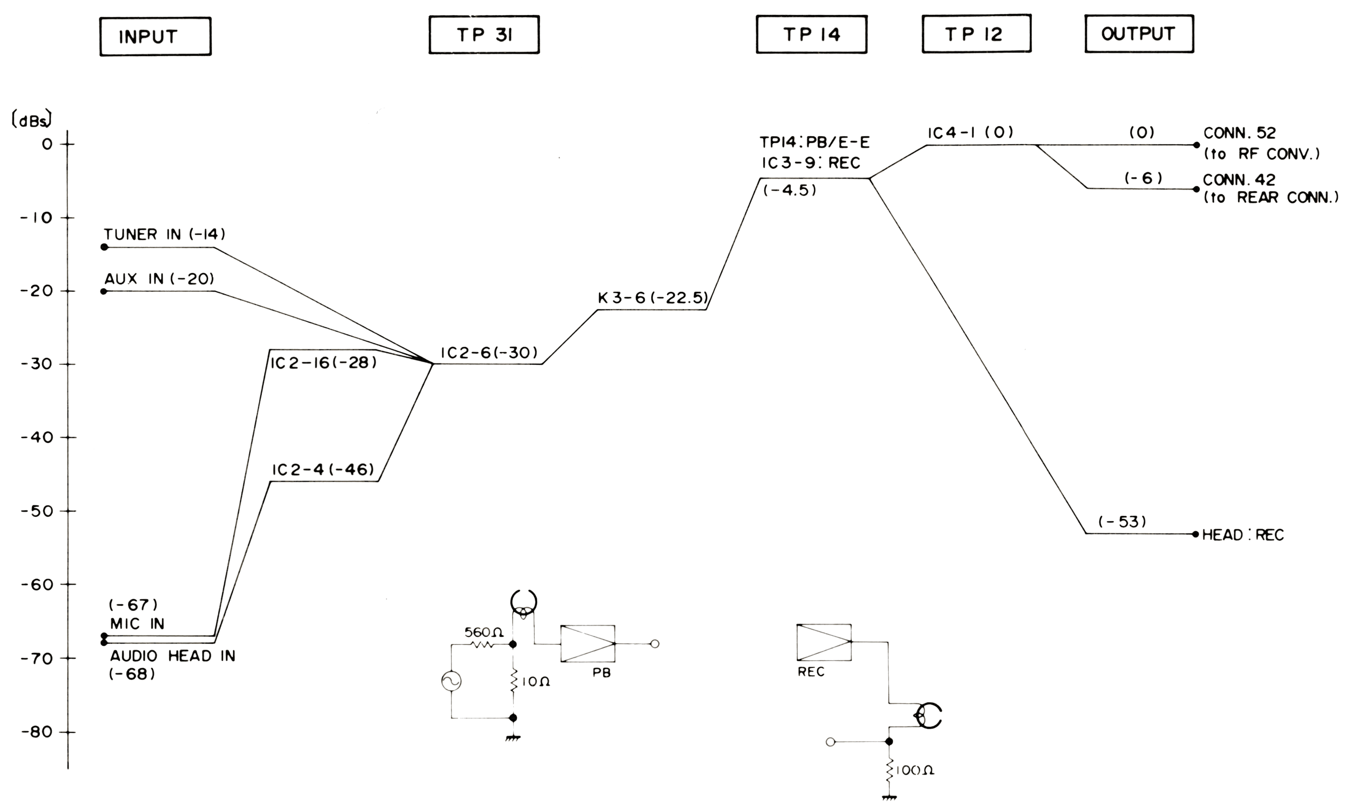

TP11
(AUDIO IN)
220 mVp-p
IC2-4
(PB PRE OUT)
16 mVp-p
IC3-6
(DOLBY IN)
135 mVp-p
TP14
(MONITOR OUT)
1.1 Vp-p
TP12
(AUDIO OUT)
2.2 Vp-p
CONN. 42
(AUDIO OUT)
1.1 Vp-p
TP13
(AUDIO HEAD BIAS)
38 Vp-p
70 kHz
CONN. 12, 11
(REC CURRENT)
2.0 mVrms
Q17-C
(BIAS OSC)
18.5 Vp-p
70 kHz
TP32
(F.E. HEAD)
59 Vp-p
70 kHz
IC4-7
(REC OUT)
1.4 Vp-p
Q15-C
(CUE OSC OUT)
15.5 Vp-p
30 Hz
1 8 AUDIO
IC2 HA12005
IC3 TA7629P
IC1 UPD4066C
IC4 NJM4560D
IC5 BA222
Q1 2SD636R,S
Q2 2SB641R,S
Q3 2SD636R,S
Q4 2SD661S
Q5 2SD636R,S
Q6 2SB788S,T,U
Q7 2SD636R,S
Q8 2SD958S,T,U
Q9 2SD958S,T,U
Q10 2SD636R,S
Q11 2SD636R,S
Q12 2SD636R,S
Q13 2SB644R,S
Q14 2SB644R,S
Q15 2SD639R,S
Q16 2SA1020O,Y
Q17 2SD639S
Q18 2SD639S
Q19 2SB641R,S
Q20 2SD636R,S
Q21 2SD636R,S
Q22 2SD636
Q23 2SD636R,S
Q24 2SD636R,S
PLAY LEVEL
REC BIAS
NTSC REC EQ
CCIR REC EQ
CCIR REC LEVEL
NTSC REC LEVEL
A R/P HEAD
A.E. HEAD
F.E. HEAD
(to V.CTL)
TUNER
LINE
CAMERA
(to SERVO)
MIC
(to INPUT SELECT SW)
(to TUNER)
AUDIO IN
GND
(to TERMINAL)
AUDIO IN
AUDIO OUT (-6dB)
AV OUT (0dB)
(to RF CONV)
AUDIO OUT
(to CAMERA CONNECTOR)
AUDIO IN/OUT
(to SERVO)
DOLBY SW
CCIR (H)
(to MECHACON)
AO
EE CONT (PLAY LOW)
NC
MUTING
REC START (REC LOW)
CUE
(to REG)
UNREG (22V)
GND
12 V

NOTES:
1. Voltages are DC-measured with a digital voltmeter during PAL recording mode.
2. Where voltage differs between recording and playback, the voltage during playback mode is shown in parentheses.

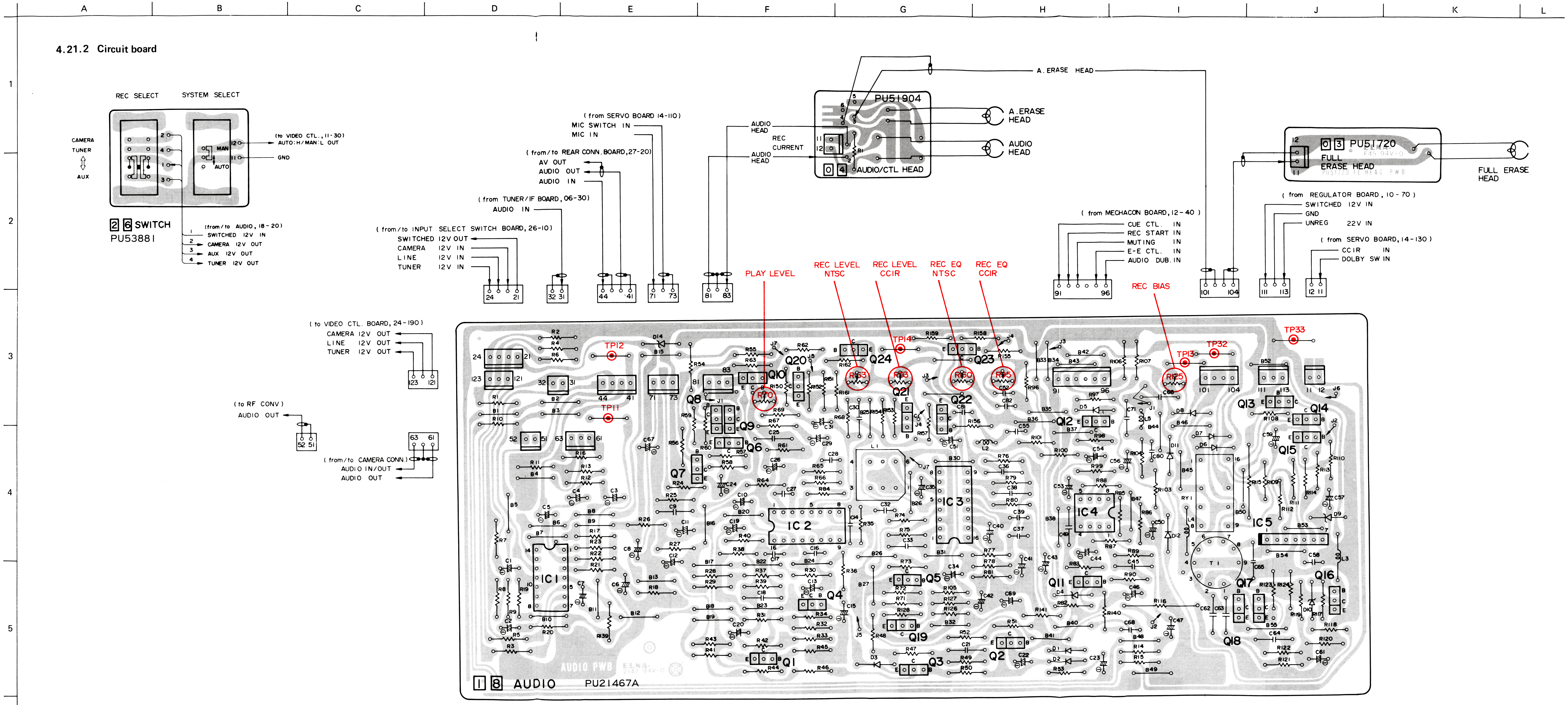
NOTE:
When not specified,
waveform is recording ro E-E mode.

NOTES: Unless otherwise specified.
1. All resistance values are in ohms. (1/8 W)
2. All inductance values are in μH.
3. All capacitance values are in μF.
4. Shaded (▨) parts are critical for safety.
Replace only with specified part numbers.

AUDIO SYSTEM LEVEL DIAGRAM (fs: 1KHz, 0dBs = 0.775 Vrms)

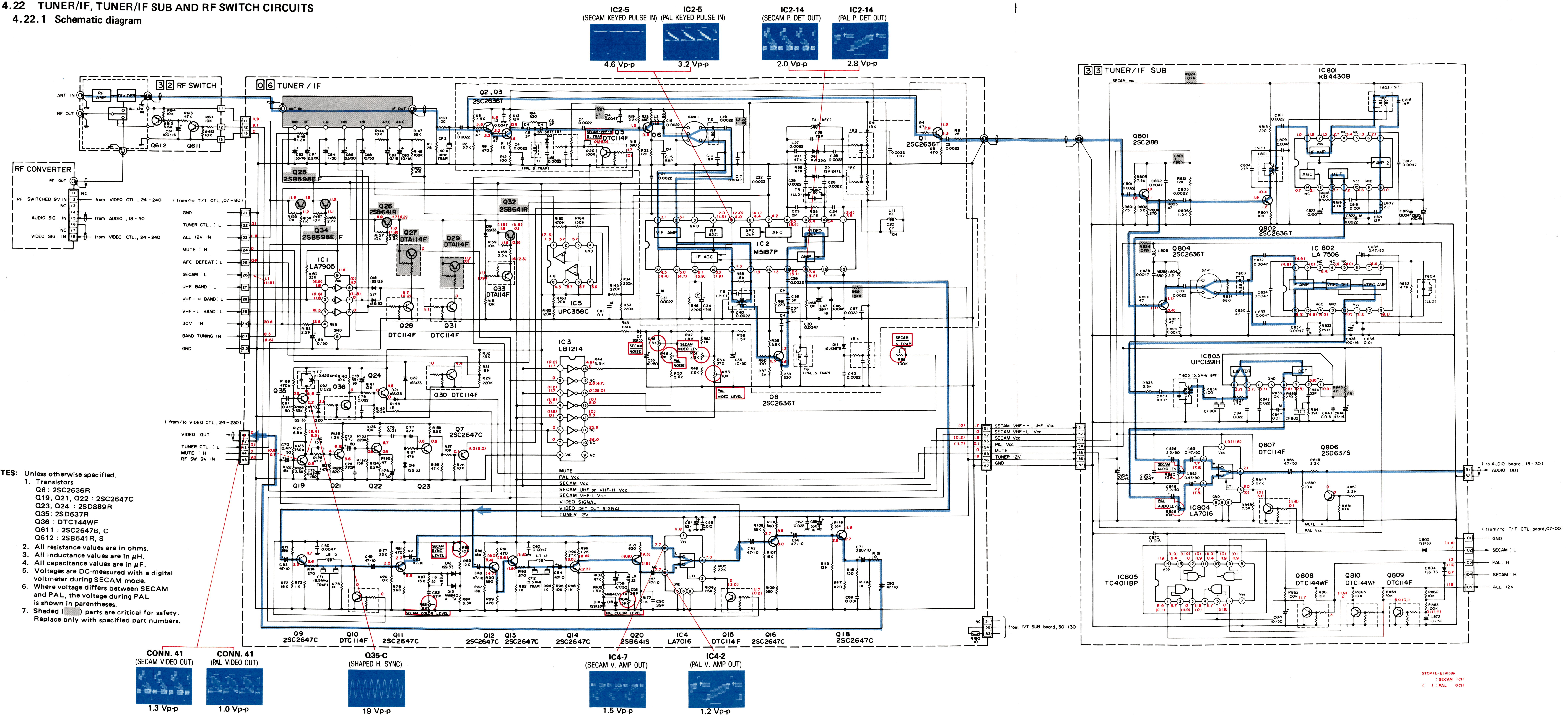


4.21.2 Circuit board


A
B
C
D
E
F
G
H
I
J
K
L
1
2
3
4
5
6
REC SELECT
SYSTEM SELECT
CAMERA
TUNER
AUX
MAN
AUTO
(to VIDEO CTL., 11-30)
AUTO:H/MAN:L OUT
GND
2 6 SWITCH
PU53881
(from/to AUDIO, 18-20)
SWITCHED 12V IN
CAMERA 12V OUT
AUX 12V OUT
TUNER 12V OUT
(from SERVO BOARD 14-110)
MIC SWITCH IN
MIC IN
(from/to REAR CONN. BOARD, 27-20)
AV OUT
AUDIO OUT
AUDIO IN
(from TUNER/IF BOARD, 06-30)
AUDIO IN
(from/to INPUT SELECT SWITCH BOARD, 26-10)
SWITCHED 12V OUT
CAMERA 12V IN
LINE 12V IN
TUNER 12V IN
AUDIO HEAD
REC CURRENT
AUDIO HEAD
PU51904
AUDIO/CTL HEAD
A.ERASE HEAD
AUDIO HEAD
A. ERASE HEAD
PU51720
FULL ERASE HEAD
FULL ERASE HEAD
(from REGULATOR BOARD, 10-70)
SWITCHED 12V IN
GND
UNREG 22V IN
(from MECHACON BOARD, 12-40)
CUE CTL. IN
REC START IN
MUTING IN
E-E CTL. IN
AUDIO DUB. IN
(from SERVO BOARD, 14-130)
CCIR IN
DOLBY SW IN
PLAY LEVEL
REC LEVEL NTSC
REC LEVEL CCIR
REC EQ NTSC
REC EQ CCIR
REC BIAS
(to VIDEO CTL. BOARD, 24-190)
CAMERA 12V OUT
LINE 12V OUT
TUNER 12V OUT
(to RF CONV)
AUDIO OUT
(from/to CAMERA CONN.)
AUDIO IN/OUT
AUDIO OUT
TP11
TP12
TP13
TP14
TP32
TP33
R70
R163
R66
R160
R165
R125
Q1
Q2
Q3
Q4
Q5
Q6
Q7
Q8
Q9
Q10
Q11
Q12
Q13
Q14
Q15
Q16
Q17
Q18
Q19
Q20
Q21
Q22
Q23
Q24
IC1
IC2
IC3
IC4
IC5
AUDIO PWB
1 8 AUDIO
PU21467A

4.22 TUNER/IF, TUNER/IF SUB AND RF SWITCH CIRCUITS

4.22.1 Schematic diagram

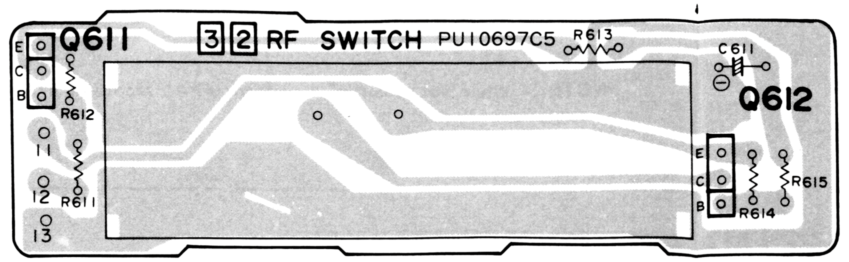

A B C D E F G H I J K L
1 2 3 4 5 6
IC2-5 (SECAM KEYED PULSE IN) 4.6 Vp-p
IC2-5 (PAL KEYED PULSE IN) 3.2 Vp-p
IC2-14 (SECAM P. DET OUT) 2.0 Vp-p
IC2-14 (PAL P. DET OUT) 2.8 Vp-p
32 RF SWITCH
ANT IN
RF OUT
RF AMP
DIVIDER
ALL 12V IN
Q612
Q611
RF CONVERTER
RF OUT
RF SWITCHED 9V IN
NC
AUDIO SIG. IN
VIDEO SIG. IN
from VIDEO CTL., 24 - 240
from AUDIO, 18 - 50
(from/to T/T CTL, 07 - 80)
GND
TUNER CTL. : L
ALL 12V IN
MUTE : H
AFC DEFEAT : L
SECAM : L
UHF BAND : L
VHF - H BAND : L
VHF - L BAND : L
30V IN
BAND TUNING IN
06 TUNER / IF
Q2, Q3 2SC2636T
Q25 2SB598E, F
Q26 2SB641R
Q34 2SB598E, F
Q27 DTA114F
Q29 DTA114F
Q32 2SB641R
Q33 DTA114F
IC1 LA7905
Q28 DTC114F
Q31 DTC114F
IC5 UPC358C
Q5 DTC114F
Q6
Q1 2SC2636T
IC2 M5187P
VIF AMP
RF AGC
AFC DEF
AFC
VIDEO DET
IF AGC
AMP
IC3 LB1214
Q24
Q36
Q35
Q30 DTC114F
Q7 2SC2647C
Q8 2SC2636T
SECAM NOISE
SECAM VIDEO LEV.
PAL NOISE
PAL VIDEO LEVEL
SECAM S. TRAP
(from/to VIDEO CTL, 24 - 230)
VIDEO OUT
TUNER CTL. : L
MUTE : H
RF SW 9V IN
Q19 Q21 Q22 Q23
MUTE
PAL Vcc
SECAM Vcc
SECAM UHF or VHF-H Vcc
SECAM VHF-L Vcc
VIDEO SIGNAL
VIDEO DET OUT SIGNAL
TUNER 12V
SECAM SYNC LEVEL
SECAM COLOR LEVEL
PAL COLOR LEVEL
Q9 2SC2647C
Q10 DTC114F
Q11 2SC2647C
Q12 2SC2647C
Q13 2SC2647C
Q14 2SC2647C
Q20 2SB641S
IC4 LA7016
Q15 DTC114F
Q16 2SC2647C
Q18 2SC2647C
CONN. 41 (SECAM VIDEO OUT) 1.3 Vp-p
CONN. 41 (PAL VIDEO OUT) 1.0 Vp-p
Q35-C (SHAPED H. SYNC) 19 Vp-p
IC4-7 (SECAM V. AMP OUT) 1.5 Vp-p
IC4-2 (PAL V. AMP OUT) 1.2 Vp-p
SECAM VHF-H, UHF Vcc
SECAM VHF-L Vcc
SECAM Vcc
PAL Vcc
MUTE
TUNER 12V
GND
from T/T SUB board, 30-130
33 TUNER/IF SUB
Q801 2SC2188
Q802 2SC2636T
IC801 KB4430B
IF AMP
AGC
DET
F AMP-2
Q804 2SC2636T
IC802 LA7506
IF AMP
VIDEO DET
VIDEO AMP
IC803 UPC1391H
LIMITER
DET
Q807 DTC114F
Q806 2SD637S
SECAM AUDIO LEV.
PAL AUDIO LEV.
IC804 LA7016
(to AUDIO board, 18 - 30)
AUDIO OUT
MUTE : H
PAL Vcc
IC805 TC4011BP
Q808 DTC144WF
Q810 DTC144WF
Q809 DTC114F
(from/to T/T CTL. board, 07-00)
GND
SECAM : L
PAL : H
SECAM : H
ALL 12V
STOP (E-E) mode
: SECAM 1CH
( ) : PAL 6CH

NOTES: Unless otherwise specified.

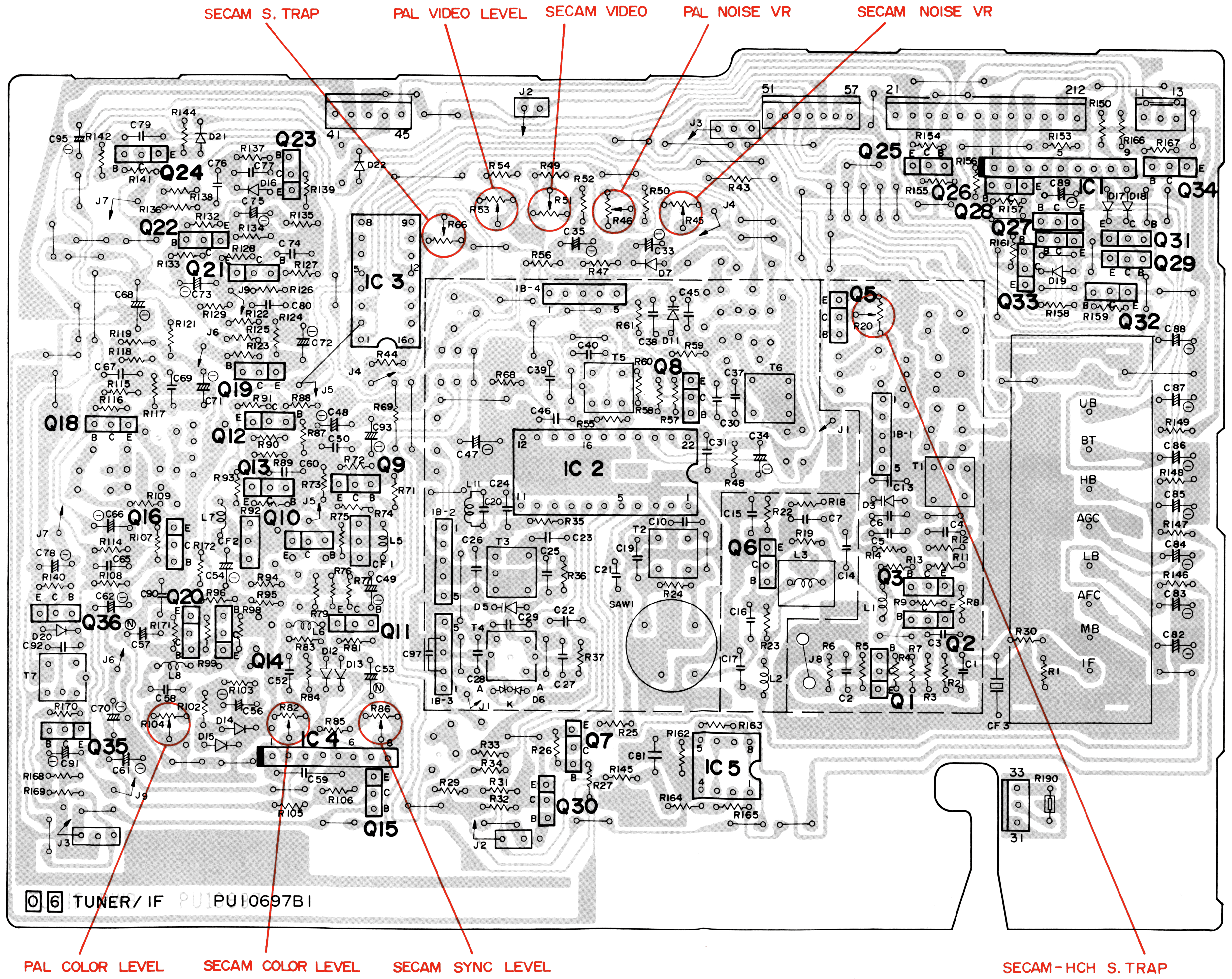
1. Transistors
   - Q6 : 2SC2636R
   - Q19, Q21, Q22 : 2SC2647C
   - Q23, Q24 : 2SD889R
   - Q35: 2SD637R
   - Q36 : DTC144WF
   - Q611 : 2SC2647B, C
   - Q612 : 2SB641R, S
2. All resistance values are in ohms.
3. All inductance values are in μH.
4. All capacitance values are in μF.
5. Voltages are DC-measured with a digital voltmeter during SECAM mode.
6. Where voltage differs between SECAM and PAL, the voltage during PAL is shown in parentheses.
7. Shaded (▨) parts are critical for safety. Replace only with specified part numbers.

4.22.2 Circuit boards

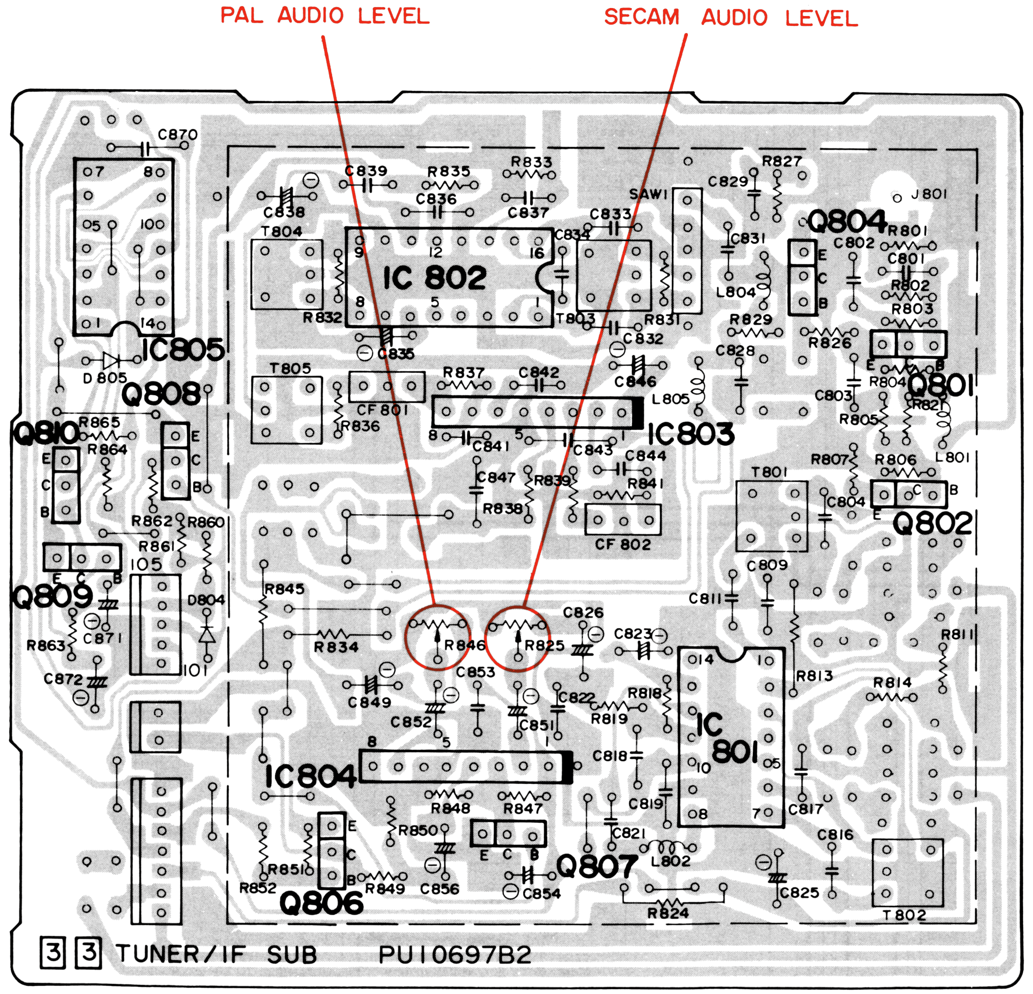
– RF SWITCH –


Q611
3 2 RF SWITCH PU10697C5
Q612
R611
R612
R613
R614
R615
C611

– TUNER IF –


SECAM S. TRAP
PAL VIDEO LEVEL
SECAM VIDEO
PAL NOISE VR
SECAM NOISE VR
PAL COLOR LEVEL
SECAM COLOR LEVEL
SECAM SYNC LEVEL
SECAM-HCH S. TRAP
0 6 TUNER/IF PU10697B1
IC 2
IC 3
IC 4
IC 5
IC1
Q1
Q2
Q3
Q5
Q6
Q7
Q8
Q9
Q10
Q11
Q12
Q13
Q14
Q15
Q16
Q18
Q19
Q20
Q21
Q22
Q23
Q24
Q25
Q26
Q27
Q28
Q29
Q30
Q31
Q32
Q33
Q34
Q35
Q36
UB
BT
HB
AGC
LB
AFC
MB
IF
SAW

– TUNER IF SUB –

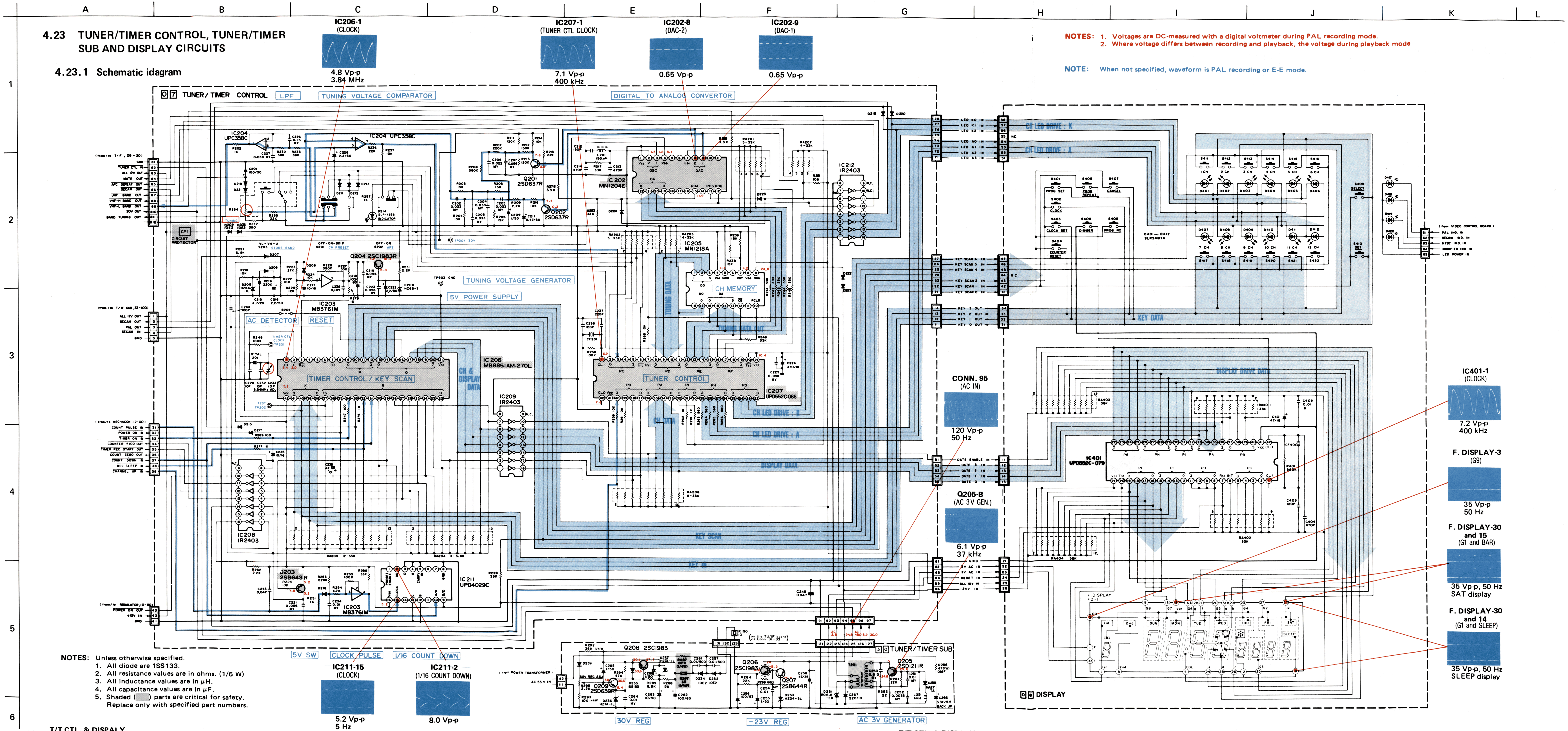

PAL AUDIO LEVEL
SECAM AUDIO LEVEL
3 3 TUNER/IF SUB PU10697B2
IC 802
IC803
IC804
IC805
IC 801
Q801
Q802
Q804
Q806
Q807
Q808
Q809
Q810

4.23 TUNER/TIMER CONTROL, TUNER/TIMER SUB AND DISPLAY CIRCUITS

4.23.1 Schematic idagram

NOTES: 1. Voltages are DC-measured with a digital voltmeter during PAL recording mode.
2. Where voltage differs between recording and playback, the voltage during playback mode

NOTE: When not specified, waveform is PAL recording or E-E mode.



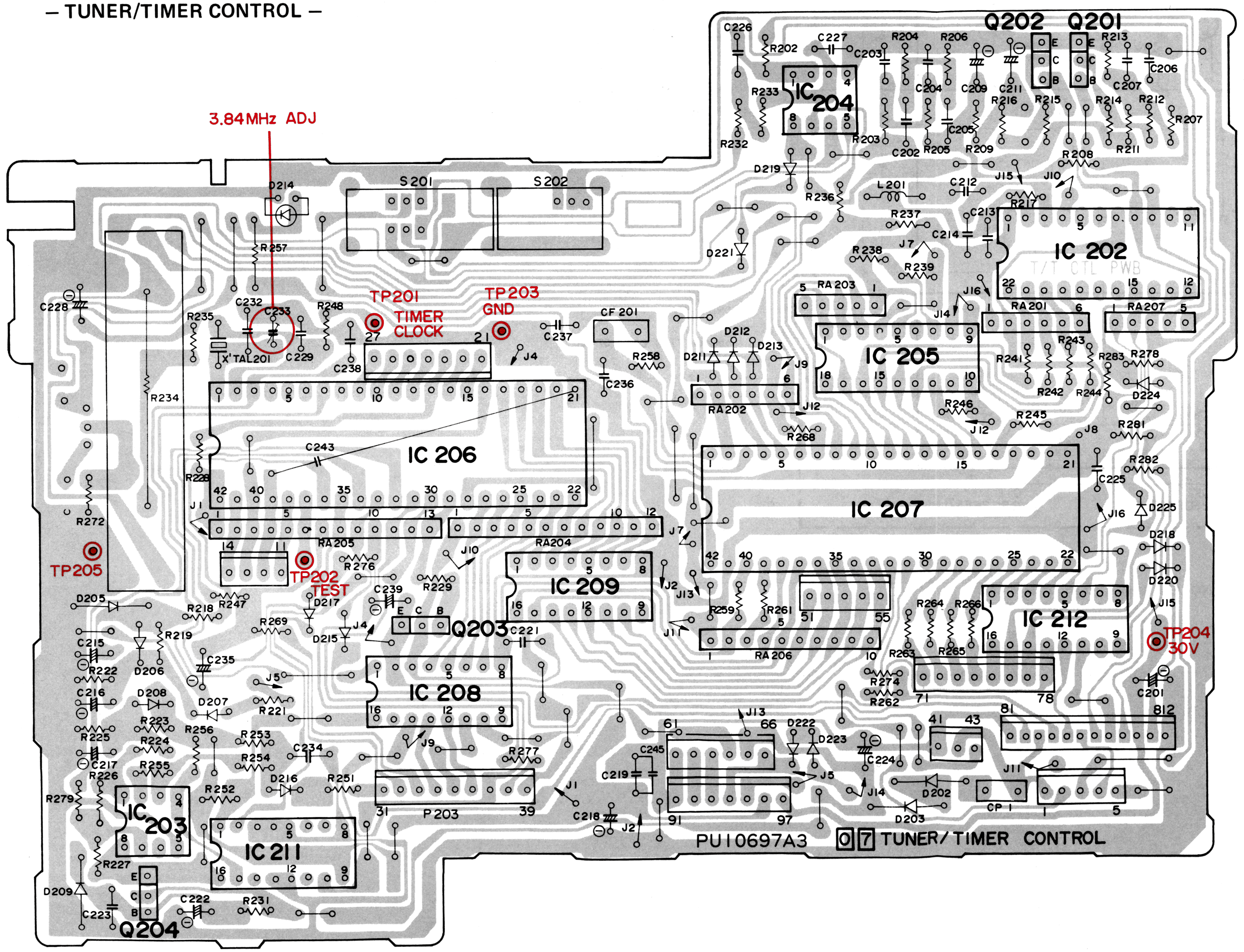
A
B
C
D
E
F
G
H
I
J
K
L
1
2
3
4
5
6
IC206-1
(CLOCK)
4.8 Vp-p
3.84 MHz
IC207-1
(TUNER CTL CLOCK)
7.1 Vp-p
400 kHz
IC202-8
(DAC-2)
0.65 Vp-p
IC202-9
(DAC-1)
0.65 Vp-p
07 TUNER/TIMER CONTROL
LPF
TUNING VOLTAGE COMPARATOR
DIGITAL TO ANALOG CONVERTOR
IC204 UPC358C
IC202 MN1204E
Q201 2SD637R
Q202 2SD637R
IC212 IR2403
IC205 MN1218A
CH MEMORY
TUNING DATA
TUNING VOLTAGE GENERATOR
5V POWER SUPPLY
Q204 2SC1983R
IC203 MB3761M
AC DETECTOR
RESET
CIRCUIT PROTECTOR
IC 206 MB8851AM-270L
TIMER CONTROL/ KEY SCAN
CH & DISPLAY DATA
TUNER CONTROL
IC207 UPD552C088
IC209 IR2403
CH LED DRIVE : K
CH LED DRIVE : A
DISPLAY DATA
KEY SCAN
KEY IN
KEY DATA
DISPLAY DRIVE DATA
IC208 IR2403
J203 2SB643R
IC211 UPD4029C
IC203 MB3761M
5V SW
CLOCK PULSE
1/16 COUNT DOWN
IC211-15
(CLOCK)
5.2 Vp-p
5 Hz
IC211-2
(1/16 COUNT DOWN)
8.0 Vp-p
Q208 2SC1983
Q209 2SD639R
Q206 2SC1983
Q207 2SB644R
Q205 2SD1211R
30V REG
-23V REG
AC 3V GENERATOR
10 TUNER/TIMER SUB
CONN. 95
(AC IN)
120 Vp-p
50 Hz
Q205-B
(AC 3V GEN.)
6.1 Vp-p
37 kHz
IC401 UPD552C-079
D401～D412 SLR54MT4
IC401-1
(CLOCK)
7.2 Vp-p
400 kHz
F. DISPLAY-3
(G9)
35 Vp-p
50 Hz
F. DISPLAY-30
and 15
(G1 and BAR)
35 Vp-p, 50 Hz
SAT display
F. DISPLAY-30
and 14
(G1 and SLEEP)
35 Vp-p, 50 Hz
SLEEP display
09 DISPLAY

NOTES: Unless otherwise specified.

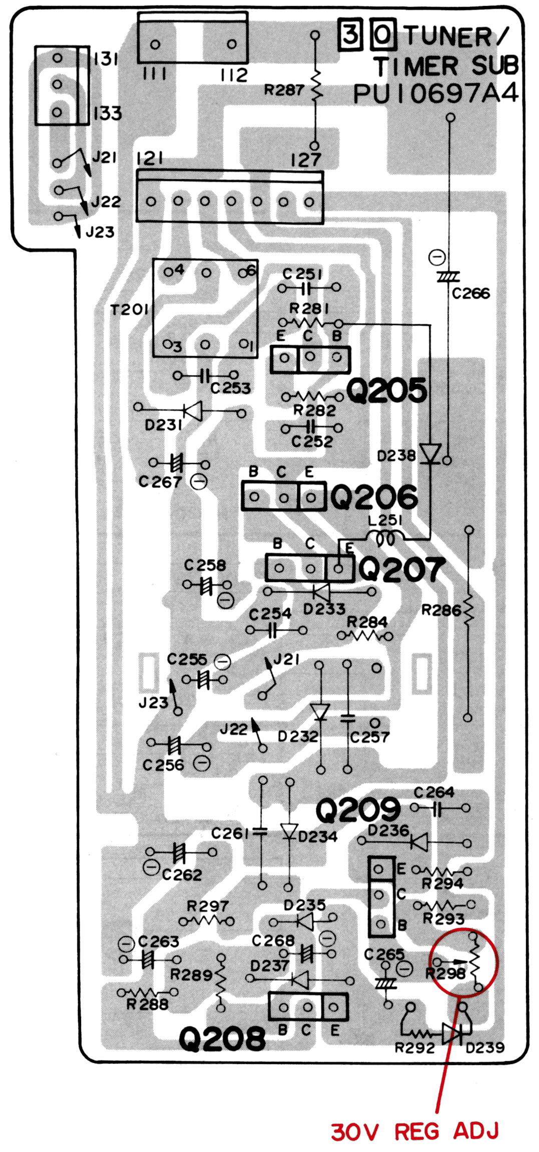
1. All diode are 1SS133.
2. All resistance values are in ohms. (1/6 W)
3. All inductance values are in μH.
4. All capacitance values are in μF.
5. Shaded ( ) parts are critical for safety. Replace only with specified part numbers.

4.23.2 Circuit boards

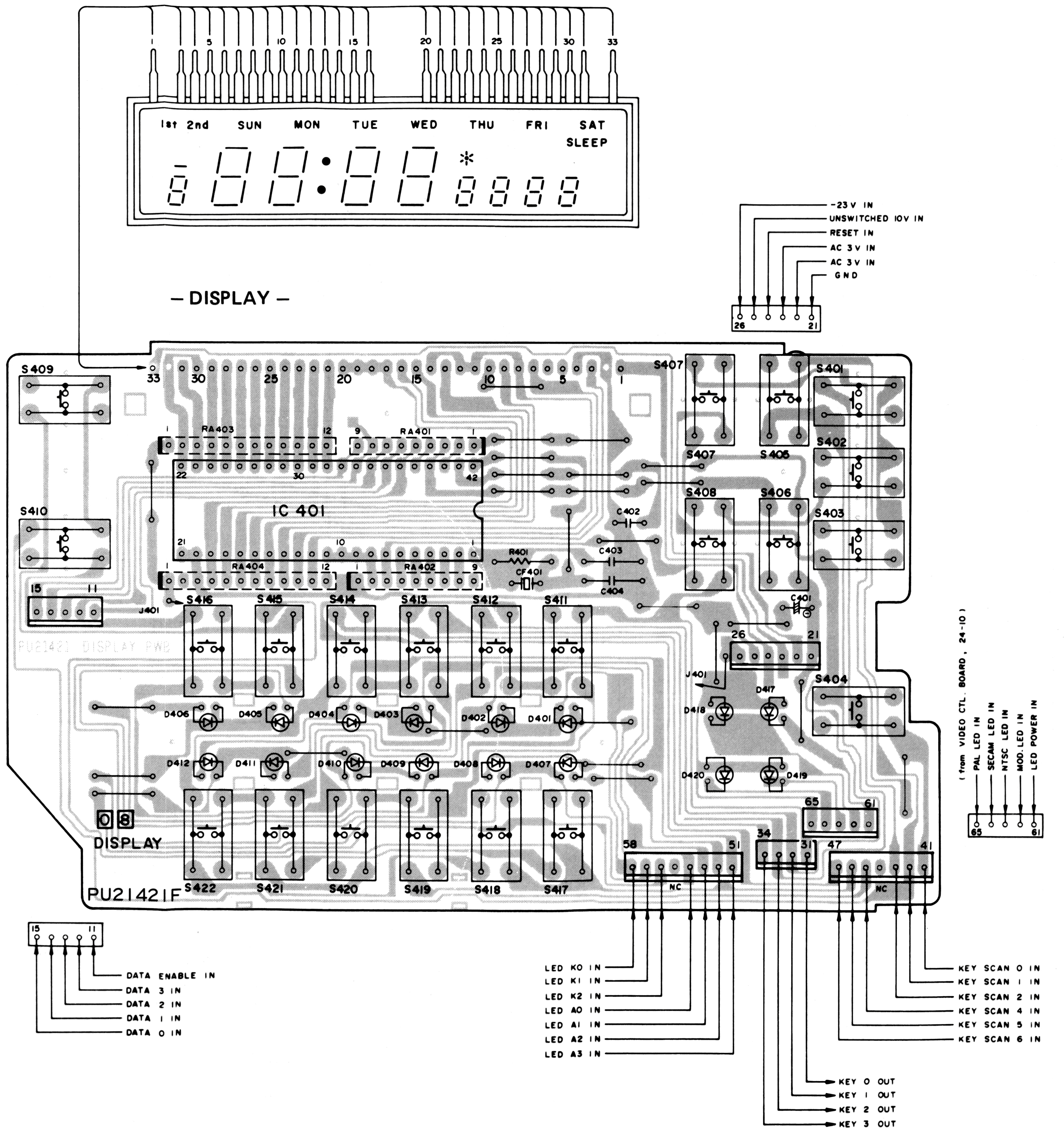
— TUNER/TIMER CONTROL —


3.84MHz ADJ
TP201 TIMER CLOCK
TP203 GND
TP202 TEST
TP205
TP204 30V
X'TAL201
S201
S202
IC 202
IC 203
IC 204
IC 205
IC 206
IC 207
IC 208
IC 209
IC 211
IC 212
Q201
Q202
Q203
Q204
P203
CF 201
CP 1
PU10697A3
07 TUNER/TIMER CONTROL

— TUNER/TIMER SUB —

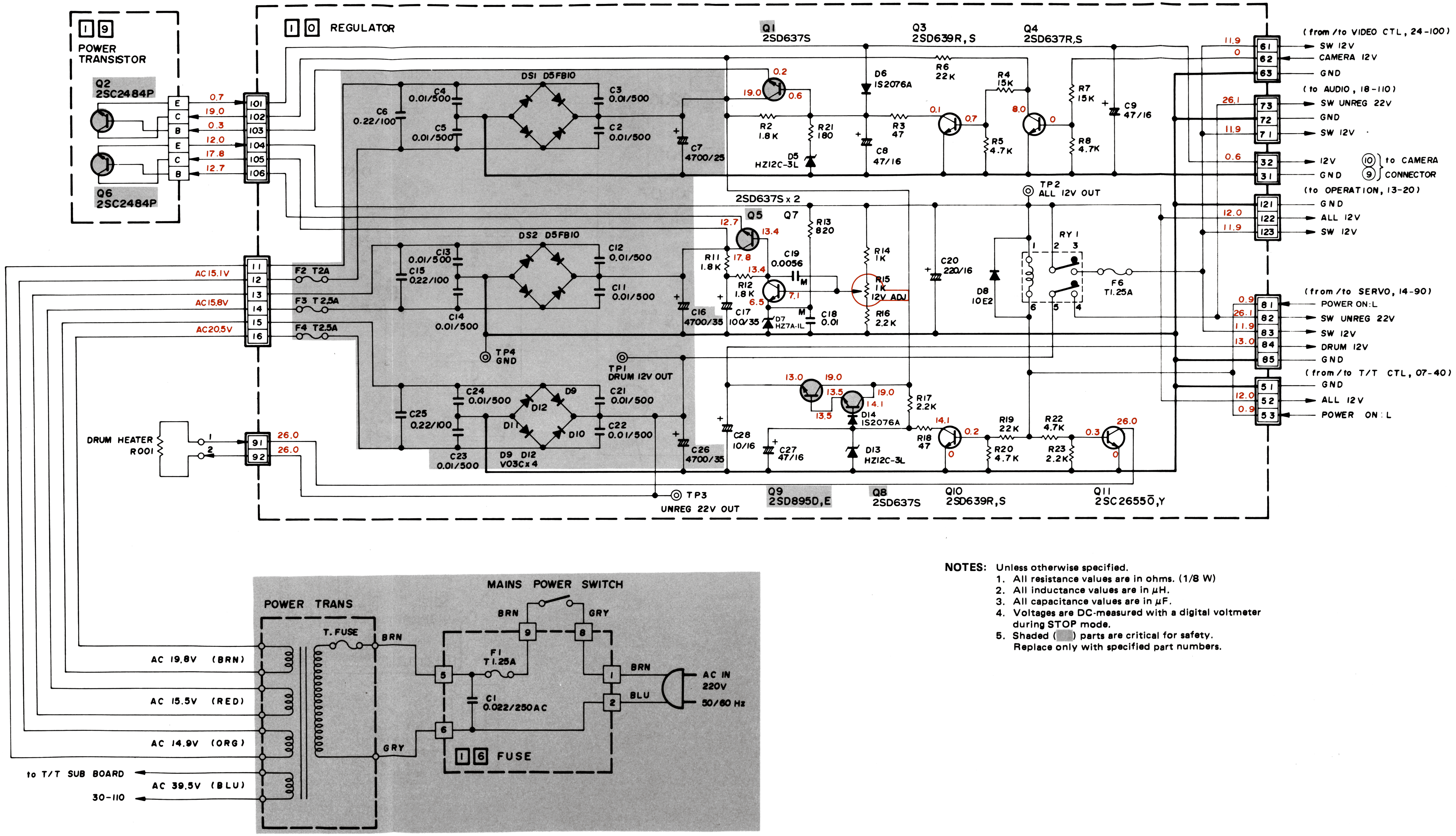

30 TUNER/TIMER SUB
PU10697A4
T201
Q205
Q206
Q207
Q208
Q209
30V REG ADJ

— DISPLAY —


1st 2nd SUN MON TUE WED THU FRI SAT SLEEP
-23V IN
UNSWITCHED 10V IN
RESET IN
AC 3V IN
AC 3V IN
GND
IC 401
08 DISPLAY
PU21421F
DATA ENABLE IN
DATA 3 IN
DATA 2 IN
DATA 1 IN
DATA 0 IN
LED K0 IN
LED K1 IN
LED K2 IN
LED A0 IN
LED A1 IN
LED A2 IN
LED A3 IN
KEY SCAN 0 IN
KEY SCAN 1 IN
KEY SCAN 2 IN
KEY SCAN 4 IN
KEY SCAN 5 IN
KEY SCAN 6 IN
KEY 0 OUT
KEY 1 OUT
KEY 2 OUT
KEY 3 OUT
(from VIDEO CTL. BOARD, 24-10)
PAL LED IN
SECAM LED IN
NTSC LED IN
MOD LED IN
LED POWER IN

4.24 REGULATOR CIRCUIT

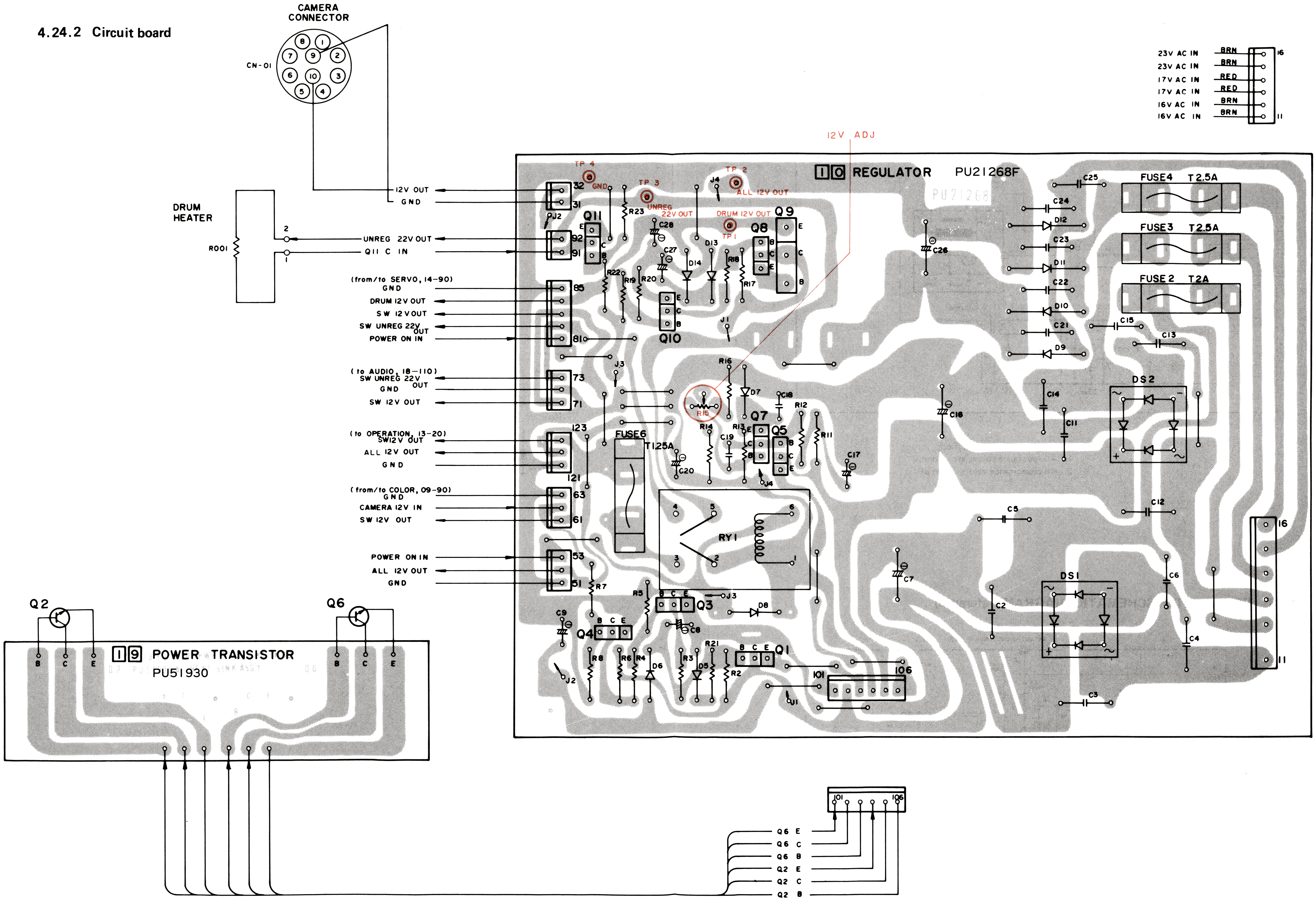
4.24.1 Schematic diagram


1 9 POWER TRANSISTOR
Q2 2SC2484P
Q6 2SC2484P
E C B E C B
0.7
19.0
0.3
12.0
17.8
12.7
101 102 103 104 105 106
1 0 REGULATOR
DS1 D5FB10
C4 0.01/500
C6 0.22/100
C5 0.01/500
C3 0.01/500
C2 0.01/500
C7 4700/25
DS2 D5FB10
C13 0.01/500
C15 0.22/100
C14 0.01/500
C12 0.01/500
C11 0.01/500
C16 4700/35
TP4 GND
TP1 DRUM 12V OUT
C24 0.01/500
C25 0.22/100
C23 0.01/500
D9 D12 D11 D10
D9 D12 V03C x 4
C21 0.01/500
C22 0.01/500
C26 4700/35
TP3 UNREG 22V OUT
11 12 13 14 15 16
AC15.1V
AC15.8V
AC20.5V
F2 T2A
F3 T2.5A
F4 T2.5A
DRUM HEATER R001
1 2
91 92
26.0
26.0
Q1 2SD637S
Q3 2SD639R,S
Q4 2SD637R,S
0.2
19.0
0.6
R2 1.8K
R21 180
D5 HZ12C-3L
D6 1S2076A
C8 47/16
R3 47
R6 22K
0.1
0.7
R4 15K
8.0
0
R5 4.7K
R7 15K
R8 4.7K
C9 47/16
TP2 ALL 12V OUT
2SD637S x 2
Q5
Q7
12.7
13.4
R11 1.8K
17.8
13.4
R12 1.8K
6.5
7.1
C19 0.0056
M
M
C17 100/35
D7 HZ7A-1L
C18 0.01
R13 820
R14 1K
R15 1K 12V ADJ
R16 2.2K
C20 220/16
D8 10E2
RY1
1 2 3 6 5 4
F6 T1.25A
13.0
19.0
13.5
19.0
14.1
13.5
D14 1S2076A
C28 10/16
C27 47/16
D13 HZ12C-3L
R17 2.2K
R18 47
14.1
0.2
0
R19 22K
R20 4.7K
R22 4.7K
R23 2.2K
0.3
26.0
0
Q9 2SD895D,E
Q8 2SD637S
Q10 2SD639R,S
Q11 2SC2655O,Y
(from/to VIDEO CTL, 24-100)
11.9 61 SW 12V
0 62 CAMERA 12V
63 GND
(to AUDIO, 18-110)
26.1 73 SW UNREG 22V
72 GND
11.9 71 SW 12V
0.6 32 12V
31 GND
⑩ ⑨ to CAMERA CONNECTOR
(to OPERATION, 13-20)
121 GND
12.0 122 ALL 12V
11.9 123 SW 12V
(from/to SERVO, 14-90)
0.9 81 POWER ON:L
26.1 82 SW UNREG 22V
11.9 83 SW 12V
13.0 84 DRUM 12V
85 GND
(from/to T/T CTL, 07-40)
51 GND
12.0 52 ALL 12V
0.9 53 POWER ON:L
POWER TRANS
T. FUSE
BRN
GRY
AC 19.8V (BRN)
AC 15.5V (RED)
AC 14.9V (ORG)
AC 39.5V (BLU)
to T/T SUB BOARD 30-110
MAINS POWER SWITCH
BRN
GRY
9 8 5 6 1 2
F1 T1.25A
C1 0.022/250AC
1 6 FUSE
BRN
BLU
AC IN 220V 50/60 Hz

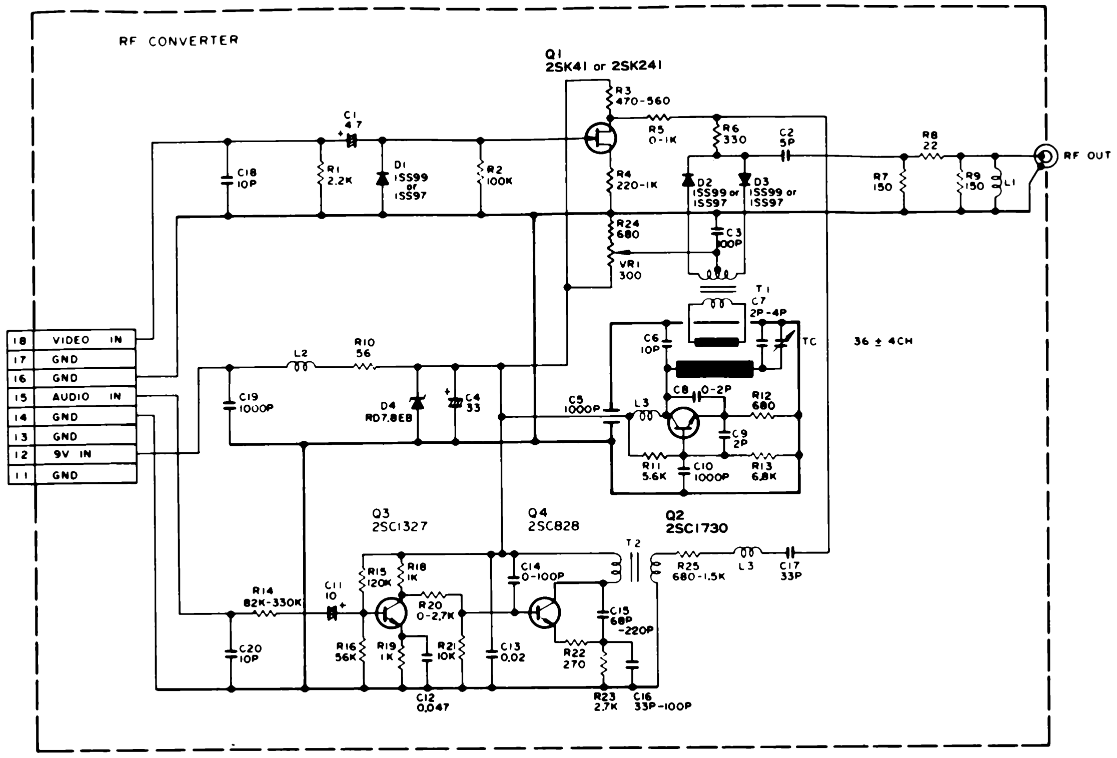
NOTES: Unless otherwise specified.

1. All resistance values are in ohms. (1/8 W)
2. All inductance values are in μH.
3. All capacitance values are in μF.
4. Voltages are DC-measured with a digital voltmeter during STOP mode.
5. Shaded (▨) parts are critical for safety. Replace only with specified part numbers.

4.24.2 Circuit board

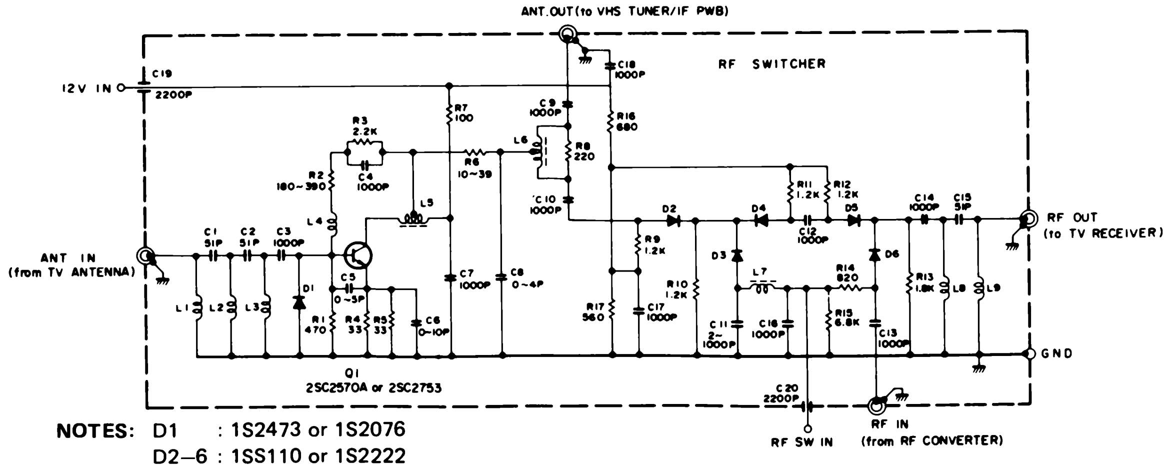

CAMERA CONNECTOR
CN-01
DRUM HEATER
R001
12V OUT
GND
UNREG 22V OUT
Q11 C IN
(from/to SERVO, 14-90)
GND
DRUM 12V OUT
SW 12V OUT
SW UNREG 22V OUT
POWER ON IN
(to AUDIO, 18-110)
SW UNREG 22V OUT
GND
SW 12V OUT
(to OPERATION, 13-20)
SW12V OUT
ALL 12V OUT
GND
(from/to COLOR, 09-90)
GND
CAMERA 12V IN
SW 12V OUT
POWER ON IN
ALL 12V OUT
GND
12V ADJ
TP 4 GND
TP 3 UNREG 22V OUT
TP 2 ALL 12V OUT
TP 1 DRUM 12V OUT
10 REGULATOR PU21268F
FUSE4 T2.5A
FUSE3 T2.5A
FUSE2 T2A
FUSE6 T125A
RY1
DS1
DS2
Q2
Q6
19 POWER TRANSISTOR PU51930
23V AC IN BRN
23V AC IN BRN
17V AC IN RED
17V AC IN RED
16V AC IN BRN
16V AC IN BRN
Q6 E
Q6 C
Q6 B
Q2 E
Q2 C
Q2 B
101
106

4.25 RF CONVERTER SCHEMATIC DIAGRAM (reference)


RF CONVERTER
Q1 2SK41 or 2SK241
Q2 2SC1730
Q3 2SC1327
Q4 2SC828
RF OUT
VIDEO IN
GND
AUDIO IN
9V IN
D1 1SS99 or 1SS97
D2 1SS99 or 1SS97
D3 1SS99 or 1SS97
D4 RD7.8EB
T1
T2
TC
36 ± 4CH
VR1 300

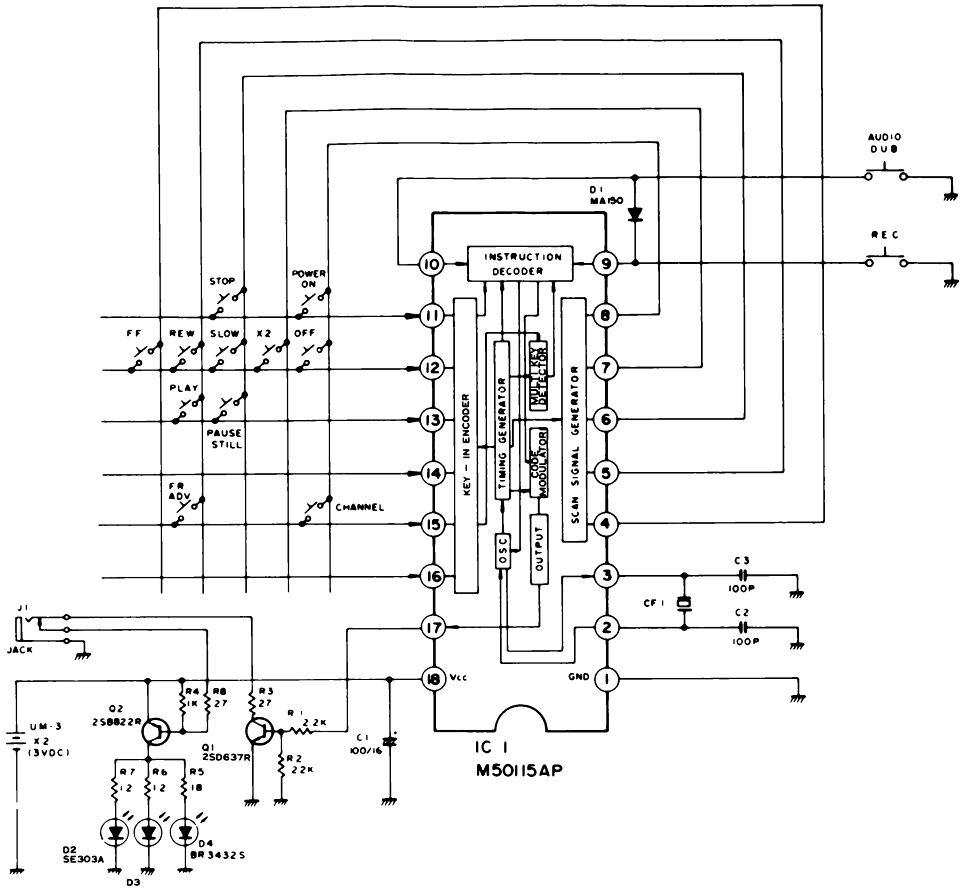
NOTES: Unless otherwise specified;
1. All resistance values are in ohms.
2. All capacitance values are in μF.

4.26 RF SWITCHER SCHEMATIC DIAGRAM (reference)


ANT.OUT(to VHS TUNER/IF PWB)
RF SWITCHER
12V IN
ANT IN (from TV ANTENNA)
RF OUT (to TV RECEIVER)
GND
RF SW IN
RF IN (from RF CONVERTER)
Q1 2SC2570A or 2SC2753

NOTES: D1 : 1S2473 or 1S2076
D2–6 : 1SS110 or 1S2222
RF SW IN : High voltage : RF IN – RF OUT
Low " : ANT IN – RF OUT

4.27 WIRELESS REMOTE CONTROL UNIT SCHEMATIC IDAGRAM (reference)


AUDIO DUB
REC
D1 MA160
INSTRUCTION DECODER
KEY-IN ENCODER
TIMING GENERATOR
SCAN SIGNAL GENERATOR
OSC
OUTPUT
STOP
POWER ON
FF
REW
SLOW
X2
OFF
PLAY
PAUSE STILL
FR ADV
CHANNEL
J1 JACK
UM-3 X2 (3VDC)
Q1 2SD637R
Q2 2SB822R
D2 SE303A
D3 SE303A
D4 BR3432S
C1 100/16
CF1
GND
IC 1 M50115AP

NOTES: Unless otherwise specified;
1. All resistance values are in ohms, 1/4 W.
2. All capacitance values are in μF.

SECTION 5
EXPLODED VIEWS AND PARTS LIST

SAFETY PRECAUTION

Parts identified by the ⚠ symbol are critical for safety.
Replace only with specified part numbers.

5.1 STANDARD PART NUMBER CODING

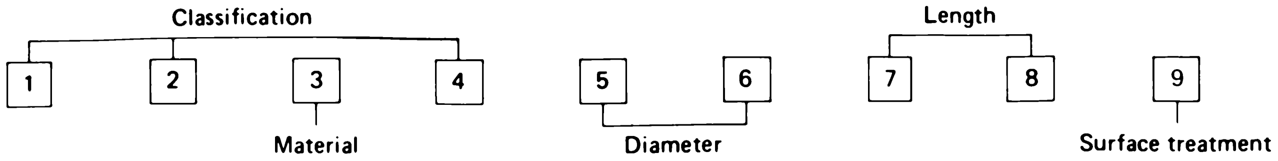
5.1.1 Screw coding . . . . 5 - 2

5.2 EXPLODED VIEWS AND PARTS LIST

5.2.1 Packing assembly . . . . 5 - 3
5.2.2 Cabinet assembly . . . . 5 - 4
5.2.3 Chassis assembly . . . . 5 - 6
5.2.4 Main deck (1) assembly . . . . 5 - 8
5.2.5 Main deck (2) assembly 5-10
5.2.6 Power transformer assembly 5-12
5.2.7 Drum assembly 5-13
5.2.8 Sub deck assembly 5-14
5.2.9 Cassette housing assembly 5-16
5.2.10 Remote control unit 5-18

5.1 STANDARD PART NUMBER CODING

5.1.1 Screw coding



Classification (first digit)

Symbol Letter	Name
S	Normal screw
N	Assembly screw
L	"
D	"
M	W. Wood screw
F	Feather screw
T	Set screw
Y	"
B	Bolt
N	Nut
W	Washer
R	E-ring
E	Eyelet
P	Spring
G	Washer head screw

Shape of Screw Head (second digit)

Symbol Letter		Shape of Screw Head
P		Pan head
S		Flat countersunk head
H		Oval countersunk head
D		Binding head
R		Round head
B		Round head
T		Truss head

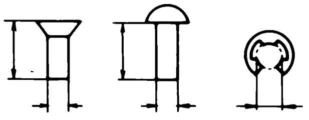
Material (third digit)

Symbol Letter	Material
S	Steel
E	Stainless steel
C	Cast iron
U	Bronze
B	Brass
P	Phosphor bronze
N	German silver
Y	Brass
A	Aluminum
Z	Zinc alloy
K	Polycarbonate

Type of Screw (fourth digit)

Symbol Letter	Type of Screw
P	Cross-Recessed head screw
A	Tapping Screw
B	Special tapping screw
T	Special tapping screw
E	Special tapping screw
F	Special tapping screw

Diameter and Length of Screw (fifth – eighth digit)



– Example –

$S\ P\ B\ P\ \underbrace{3\ 0}_{\text{(Diameter x 10)}}\ \underbrace{0\ 6}_{\text{(Length)}}\ Z$

Diameter : 3 mm

Length : 6 mm

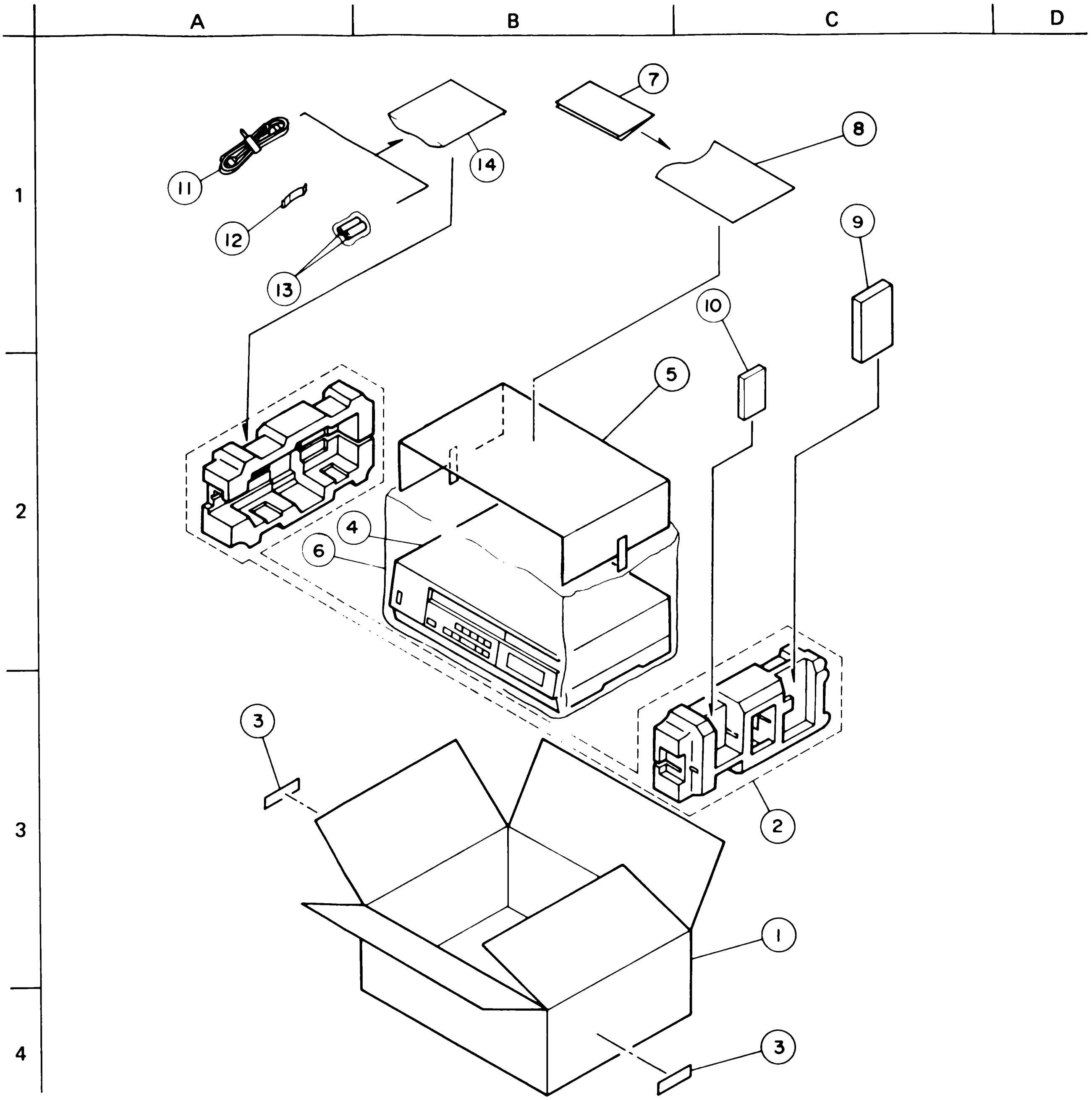
Surface Treatment (ninth digit)

Symbol Letter	Surface Treatment
Z	Galvanization, dichromic acid treatment (MFZn2-C)
N	Nickel plating (MFNi2, MFNi1)
R	Chrome plating (MBCr2, MBCr1)
G	Silver plating (SP4)
W	Nichrome platings
P	Phosphite treatment
B	Bronze plating

Symbol Letter	Surface Treatment
M	Black coloring after galvanization
A	Red coloring after galvanization
C	Blue coloring after galvanization
T	Green coloring after galvanization
V	Violet coloring after galvanization
F	Iron with black coloring

5.2 EXPLODED VIEWS AND PARTS LIST

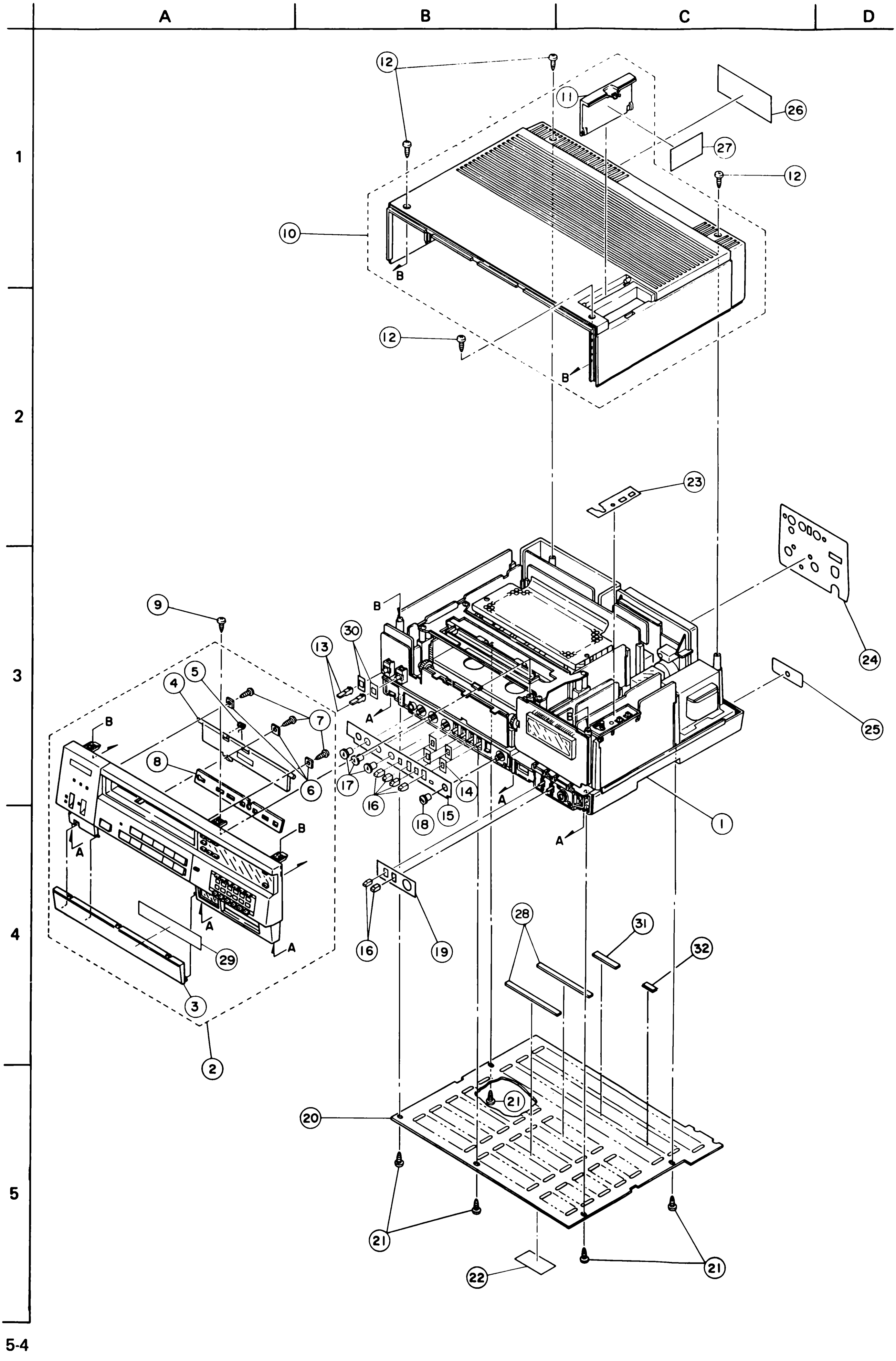
5.2.1 Packing assembly



— Packing assembly list —

Symbol No.	Part No.	Part Name	Description	Q'ty	Symbol No. Position
1	PUP30522-114	Packing Case		1	3-C
2	PUP30518A-1	Cushion Assembly		1	3-C
3	PUP40329	Serial No. Sticker		2	3-A, 4-C
4	–	Cabinet Assembly	See Section 5.2.2	1	2-B
5	PUP40503-4	Sheet		1	2-B
6	PUM30021-20	Poly Cover		1	2-A
⚠ 7	PU30425-651	Instruction Book		1	1-B
8	QPGA025-03505	Poly Bag		1	1-C
9	PTE-30	Video Cassette		1	1-C
10	–	Remoto Control Unit	See Section 5.2.10	1	1-C
⚠ 11	PU43294K	Aerial Cable Assembly		1	1-A
12	PU52523	Hook		1	1-A
13	UM-3DJ2P	Battery		2	1-A
14	QPGA023-02005	Poly Bag		1	1-B

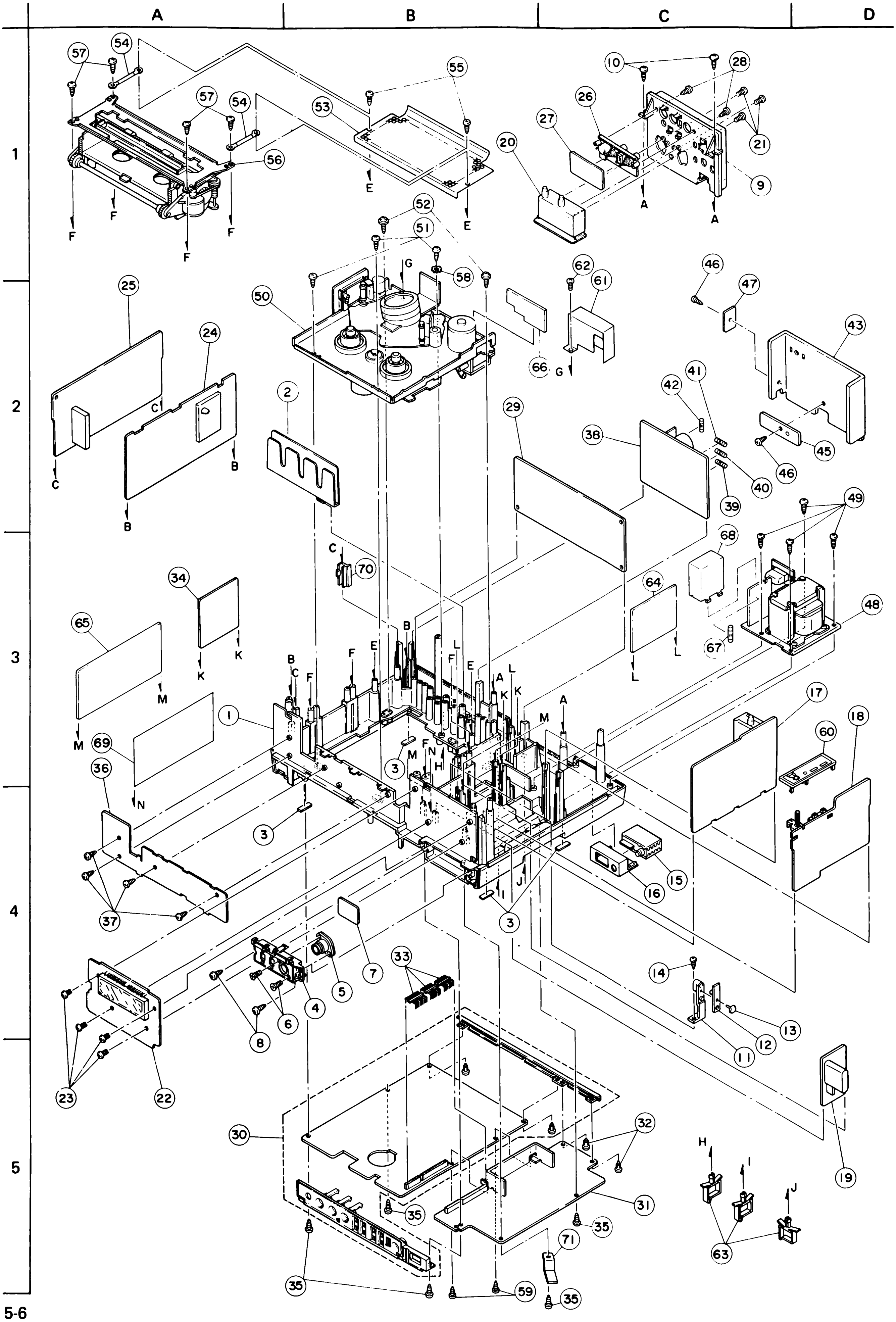
5.2.2 Cabinet assembly


A
B
C
D
1
2
3
4
5
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
A
B

– **Cabinet assembly list** –

Symbol No.	Part No.	Part Name	Description	Q'ty	Symbol No. Position
1	–	Chassis Assembly	See Section 5.2.3	1	4-C
⚠ 2	PU10396U-17	Front Panel Assembly	Incl. ③ – ⑧ and ㉙	1	5-A
3	PU21206	Door		1	4-A
4	PU33080W	Cassette Plate Assembly		1	3-A
5	PU51553	Spring		1	3-A
6	PU51552	Stopper		3	3-B
7	SDSA2610Z	Tapping Screw		3	3-B
8	PU52594-1-3	Shade (2)		1	3-A
9	SDSA4016R	Tapping Screw		1	3-A
⚠ 10	PU10565T	Top Cover Assembly	Incl. ⑪	1	1-A
11	PU33071-14	Door		1	1-C
12	SDSA4016R	Tapping Screw		4	1-B, C, 2-B
13	PU51539	Knob		2	3-B
14	PU51917-1-3	Plate		4	3-B
15	PU33708-6	Control Plate		1	4-B
16	PU51567	Knob		6	4-B
17	PU51940	"		3	3-B
18	PU51939	"		1	4-B
19	PU53879-6	Control Plate		1	4-B
⚠ 20	PU10427	Bottom Plate		1	5-B
21	SDSA3012Z	Tapping Screw		5	5-B, C
22	PU52047-2	Label	Dolby	1	5-B
23	PU33088-44	Presetter Plate		1	2-C
⚠ 24	PU33130-4	Rear Plate (B)		1	3-D
25	PU51663-2	RF Plate (B)		1	3-D
⚠ 26	PU33245-27-31	Rating Plate		1	1-C
27	PU52578-26	Label	Tuner Preset	1	1-C
28	PU52803-2	Spacer		2	4-B
29	PU21349-44	Control Label		1	4-A
30	PU51917-3	Plate		2	3-B
31	PQ40165	Spacer		1	4-C
32	" -2	"		1	4-C

5.2.3 Chassis assembly

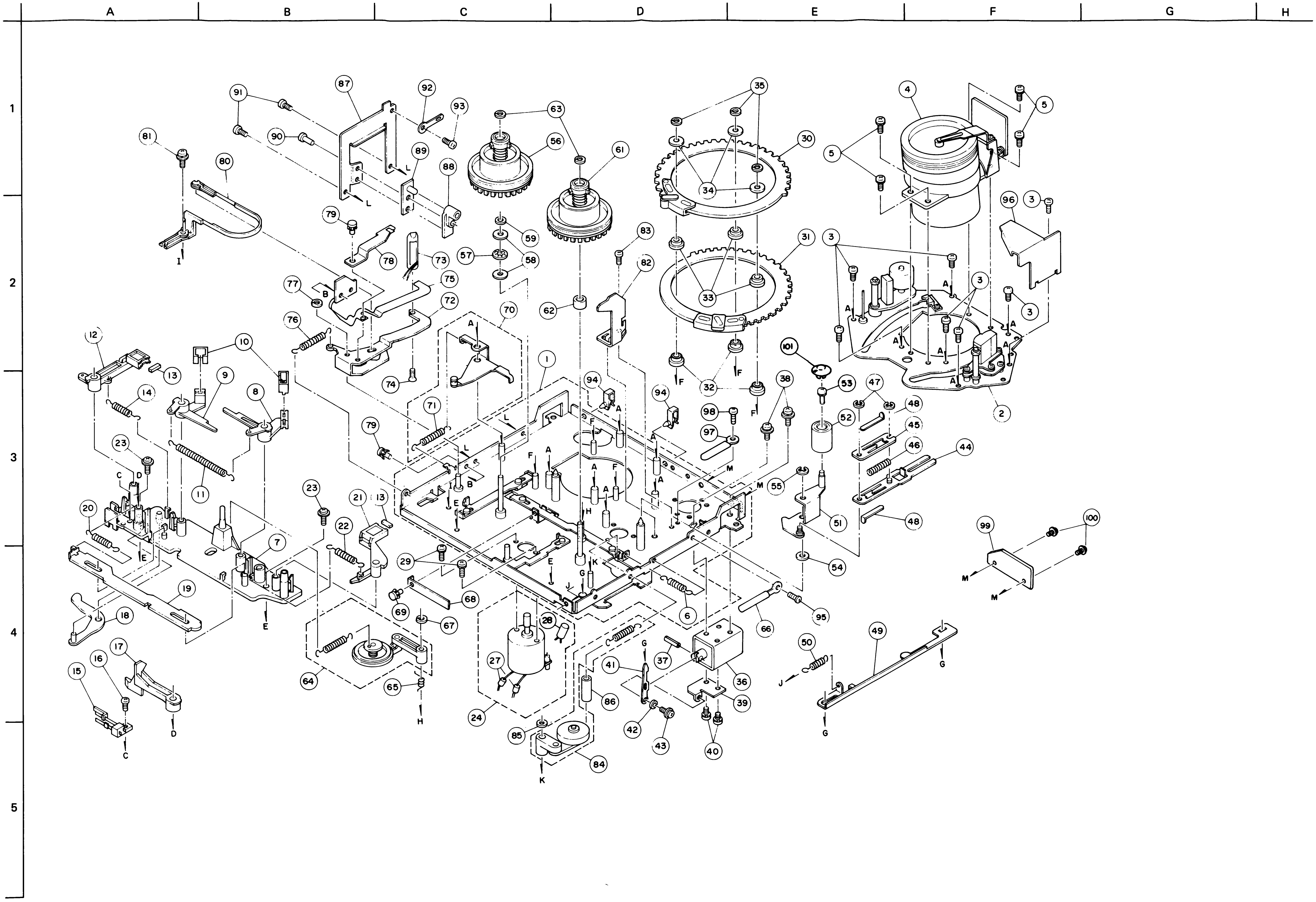


A
B
C
D
1
2
3
4
5
57
54
55
53
56
10
28
26
27
20
21
9
52
51
58
50
62
61
66
46
47
43
25
24
2
29
42
41
38
45
40
39
49
68
70
34
64
48
65
67
17
1
60
18
69
36
3
15
16
37
7
33
14
22
23
8
6
4
5
13
12
11
19
30
32
31
35
71
59
63
F
E
G
H
I
J
K
L
M
N

– Chassis assembly list –

Symbol No.	Part No.	Part Name	Description	Q'ty	Symbol No. Position
⚠ 1	PU10376-1-9	Bottom Chassis		1	3-A
2	PU33277	Wire Holder		1	2-B
3	PU50627	Foot		4	3-B, 4-A, B
4	PU33078	Control Box (2)		1	4-B
5	PU49563-2	Camera Connector		1	4-B
6	SSSP3006Z	Screw		2	4-A
7	–	Switch Board	See Section 6.2.25	1	4-B
8	SDSA3008Z	Tapping Screw		2	5-A
⚠ 9	PU21205	Connector Panel		1	1-C
10	SDSA4012Z	Tapping Screw		2	1-C
11	PU51284	Sensor Holder		1	5-C
12	–	Start Sensor Board	(PT 01) See Section 6.2.1	1	5-C
13	PU48973	Stopper		1	4-D
14	SDSA3012Z	Tapping Screw		1	4-C
⚠ 15	PU32927M	RF Converter		1	4-C
16	PU33150	RF Converter Case		1	4-C
17	–	Tuner/IF Board Assembly	See Section 6.2.6	1	3-D
18	–	Tuner/Timer Control Board Assembly	See Section 6.2.7	1	3-D
19	–	Tuner/Timer Sub Board Assembly	See Section 6.2.29	1	5-D
20	–	RF Switch Board Sssembly	See Section 6.2.31	1	1-B
21	SDSP3008R	Screw		3	1-C
22	–	Display Board Assembly	See Section 6.2.8	1	5-A
23	SDSA3008Z	Tapping Screw		4	5-A
24	–	Y & Pre/Rec Board Assembly	See Section 6.2.15	1	2-A
25	–	Color Board Assembly	See Section 6.2.9	1	2-A
26	PU51629-1-3	Connector Assembly		1	1-C
27	–	Terminal Board Assembly	See Section 6.2.26	1	1-C
28	SDSA3012R	Tapping Screw		2	1-C
29	–	Audio Board Assembly	See Section 6.2.17	1	2-B
30	–	Servo Board Assembly	See Section 6.2.14	1	5-A
31	–	Mechacon Board Assembly	See Section 6.2.12	1	5-C
32	E48729-001	Plastic Rivet		2	5-C
33	PU51946-10	Pin Assembly		3	4-B
34	–	Tuner/IF Sub Board Assembly	See Section 6.2.32	1	3-A
35	SDSA3012Z	Tapping Screw		5	5-B, C
36	–	Operation Board Assembly	See Section 6.2.13	1	3-A
37	SDSA3008Z	Tapping Screw		4	4-A
38	–	Regulator Board Assembly	See Section 6.2.10	1	2-C
⚠ 39	QMF51A2-2R0	Fuse	T2.0 A 250 V (F2)	1	2-C
⚠ 40	" -2R5	"	T2.5 A " (F3)	1	2-C
⚠ 41	" -2R5	"	T2.5 A " (F4)	1	2-C
⚠ 42	" -1R25	"	T1.25 A " (F6)	1	2-C
⚠ 43	PU33241	Heat Sink		1	2-D
44	–	–		–	–
45	–	Power Transistor Board	See Section 6.2.18	1	2-D
46	SBST3008Z	Tapping Screw		2	1-C, 2-C
47	–	Servo Power Transistor Board	See Section 6.2.33	1	2-C
48	–	Power Transformer Assembly	See Section 5.2.6	1	3-D
49	SDSA4012C	Tapping Screw		4	2-D
50	–	Main Deck Assembly	See Section 5.2.4, 5.2.5	1	2-A
51	SDSA4012C	Tapping Screw		3	1-B
52	PU51817	Special Screw		2	1-B
53	PU33465	Shield Cover		1	1-B
54	P688-06A2A2LLGC	Wire Assembly		2	1-A
55	SDSA3008Z	Tapping Screw		2	1-B
56	–	Cassette Housing Assembly	See Section 5.2.9	1	1-A
57	SDSA4012Z	Tapping Screw		4	1-A
58	WBS4000N	Screw Washer		1	1-B
59	SBST3008Z	Tapping Screw		2	5-B
60	PU33070-1-4	Pre-setter Cover		1	3-D
61	PU52429A	Shield Case Assembly		1	2-C
62	l PSP3006Z	Screw		1	1-C
63	PU52567	Wire Clip		3	5-C
64	–	Video Sub Board Assembly	See Section 6.2.11	1	3-C
65	–	Video Control Board Assembly	See Section 6.2.23	1	3-A
66	–	P.B. Chroma Amp. Board Assembly	See Section 6.2.24	1	2-B
⚠ 67	QMF51A2-1R25	Fuse	T1.25 A 250 V (F1)	1	3-C
⚠ 68	PU33151	AC Cover		1	3-C
69	PU54712	Shield Plate		1	3-A
70	PU54159	Stopper		1	3-B
71	PU55248-2	Earth Plate		1	5-C

5.2.4 Main deck (1) assembly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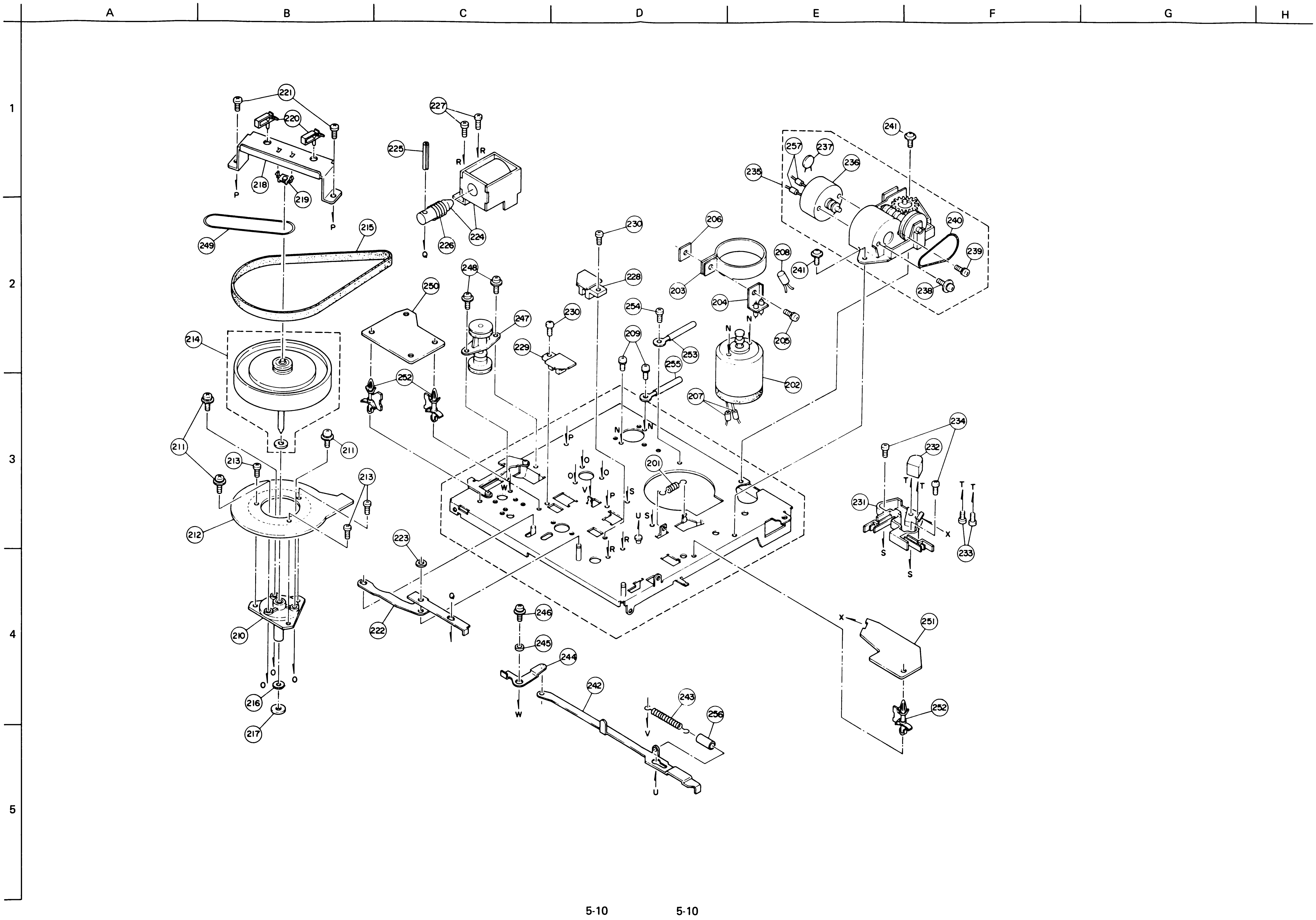
– Main deck (1) assembly list –

Symbol No.	Part No.	Part Name	Description	Q'ty	Symbol No. Position
1	PU21178D-13	Main Deck Assembly		1	2-C
2	–	Sub Deck Assembly	See Section 5.2.8	1	3-F
3	SDSP3008Z	Screw		7	2-E, F
4	–	Drum Assembly	See Section 5.2.7	1	1-F
5	LPSP3010Z	Screw		4	1-E, F
6	PUM30001-45	Spring		1	4-D
7	PU21195	Mould Base		1	4-B
8	PU50671	Take-up Main Brake		1	3-B
9	PU50713	Supply Main Brake		1	3-B
10	PU50670	Brake Shoe		2	2-B
11	PUM30001-38	Spring		1	3-B
12	PU51384	Loading Tension Brake		1	2-A
13	PUM30019-2	Pad	Overhaul Part	2	3-A, C
14	PUM30001-39	Spring		1	3-A
15	PU51259	Leaf Switch	S003	1	4-A
16	SBSF2006Z	Tapping Screw		1	4-A
17	PU50579	Record Safety Arm		1	4-A
18	PU51522	Change Lever		1	4-A
19	PU51523	Connect Plate		1	4-A
20	PUM30001-55	Spring		1	3-A
21	PU51524	Take-up Back Tension Brake		1	3-B
22	PUM30001-39	Spring		1	3-B
23	DPSP3008Z	Screw		2	3-A, B
⚠ 24	PU53577V	Reel Motor Assembly	[M003 Overhaul Part C005, 007 Incl. ㉗ and ㉘]	1	4-C
25	–	–		–	–
26	–	–		–	–
27	PU45811	Ferrite Bead		2	4-C
28	QEN41HM-105	Electrolytic Capacitor	C006 (1 μF, 50 V)	1	4-D
29	LPSP3005Z	Screw		2	4-C
30	PU48837B	Supply Loading Ring Assembly		1	1-E
31	PU48838C	Take-up Loading Ring Assembly		1	2-E
32	PU51356	Collar		3	3-D
33	PU51357	″		3	2-D
34	PUM30018-2	Spacer		3	1-D
35	PUM30017-4	Slit Washer		3	1-E
⚠ 36	PU51900-1-2	Pinch Roller Solenoid	PG02	1	4-E
37	PSE3010	Spring Pin		1	4-D
38	DPSP3006Z	Screw		2	3-E
39	PU49521	Bracket		1	4-E
40	LPSP3004Z	Screw		2	5-D
41	PU52430	Connect Plate		1	4-D
42	T30302-9	Collar		1	5-D
43	DPSP3006Z	Screw		1	5-D
44	PU51359A	Spring Holder Assembly		1	3-F
45	PU51361	Spring Holder		1	3-F
46	PUM30002-29	Spring		1	3-F
47	REE2500	E-Ring		2	3-E
48	PU51385-1-1	Spacer		2	3-F
49	PU51861	Connect Plate		1	4-E
50	PUM30001-59	Spring		1	4-E
51	PU51862A	Pinch Roller Arm Assembly		1	3-E
52	PU51367A	Pinch Roller Assembly	Overhaul Part	1	3-E
53	LPSP2604Z	Screw		1	2-E
54	PUM30018-3	Spacer		1	4-E
55	REE5000	E-Ring		1	3-E
56	PU48907D	Supply Reel Disk Assembly	Overhaul Part	1	1-D
57	PU32921A	Thrust Bearing Assembly		1	2-C
58	PUM30018-6	Spacer		2	2-C
59	Q03093-828	Washer		1	2-C
60	–	–		–	–
61	PU48907E	Take-up Reel Disk Assembly	Overhaul Part	1	1-D
62	PU51550	Collar		1	2-D
63	PUM30017-5	Slit Washer		2	1-D
64	PU48967B	Reel Idler Assembly	Overhaul Part	1	4-B
65	PU51794	Spring		1	4-C
66	PU49485	Wire Clamp		1	4-E
67	PUM30017-8	Slit Washer		1	4-C
68	PU49588	Plate Spring		1	4-C
69	E48729-009	Plastic Rivet		1	4-C
70	PU51388B-4	Cancel Lever Assembly		1	2-C
71	PUM30001-32	Spring		1	3-C
72	PU52267	Tension Arm		1	2-C
73	PU49654	Cue Head	H008 Overhaul Part	1	2-C
74	SSSP2605Z	Screw		1	3-C
75	–	Cue Head Board	See Section 6.2.21	1	2-C
76	PUM30001-62	Spring		1	2-B
77	PUM30017-5	Slit Washer		1	2-B
78	PU52269	Stopper		1	2-C
79	E48729-009	Plastic Rivet		2	2-B, 3-C
80	PU51390A	Tension Band Assembly	Overhaul Part	1	1-B
81	DPSP3008Z	Screw		1	1-A
82	PU51606	Cassette Door Guide		1	2-D
83	LPSP3005Z	Screw		1	2-D
84	PU51402	Take-up Idler Assembly	Overhaul Part	1	5-D
85	PUM30017-8	Slit Washer		1	5-C
86	QXT341H-010	UL Tube		1	4-D
87	PU51468	End Sensor Bracket		1	1-B
88	PU51285	Sensor Holder		1	1-C
89	–	End Sensor Board	(PT 02) See Section 6.2.2	1	1-C
90	PU48973-3	Stopper		1	1-B
91	LPSP3006Z	Screw		2	1-B
92	PU51692	Earth Lug		1	1-C
93	SBST3006Z	Tapping Screw		1	1-C
94	PU48016-2	Mini Clamp		2	3-D
95	SBST3005Z	Tapping Screw		1	4-E
96	PU52499	Shield Plate		1	1-F
97	PU49485-3	Wire Clamp		1	3-D
98	SBST3006Z	Tapping Screw		1	3-D
99	PU53117	PWB Holder Plate		1	4-F
100	GBST3006Z	Tapping Screw		2	4-F
101	PU53843	Pinch Roller Cap		1	2-E

5.2.5 Main deck (2) assembly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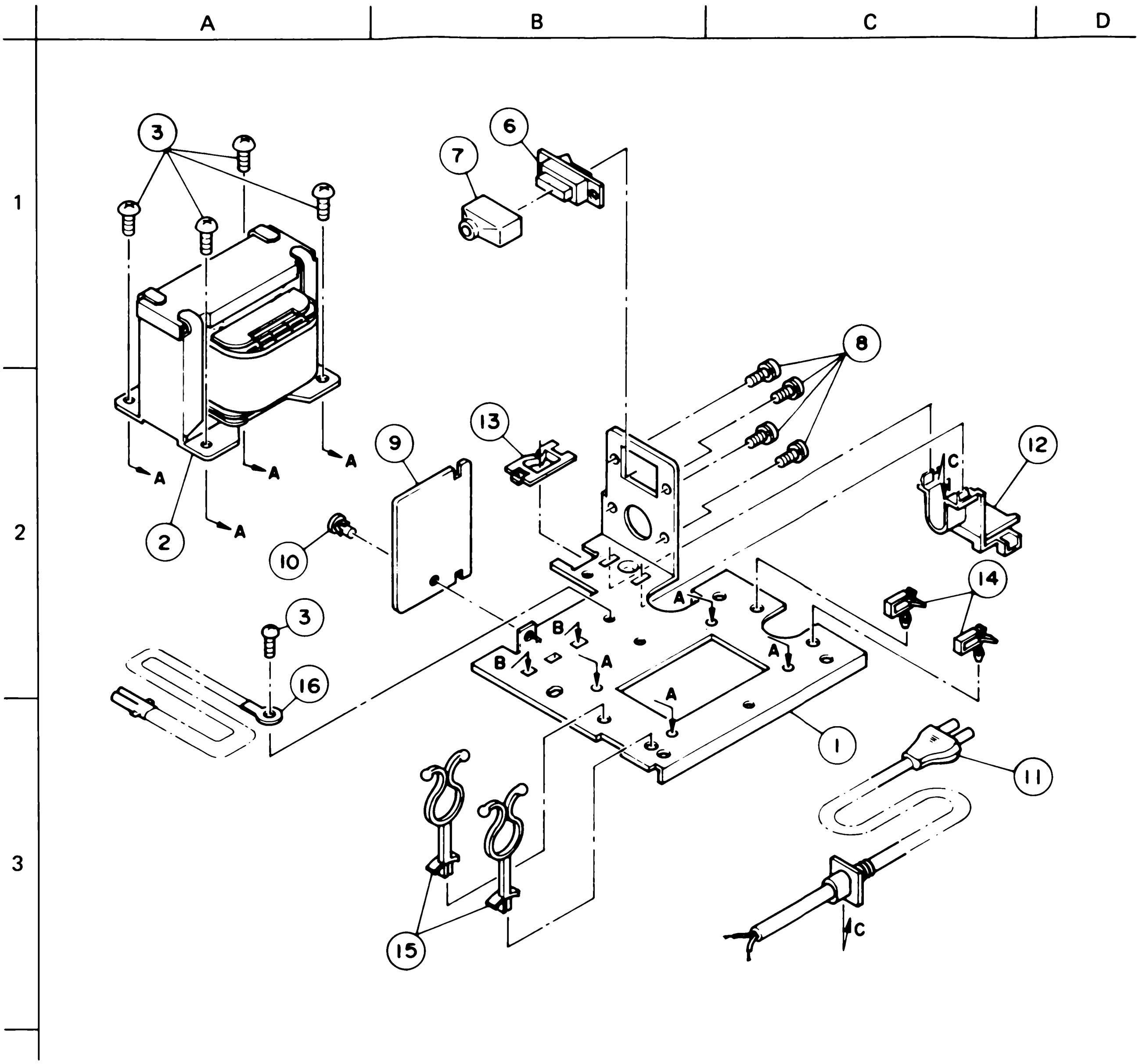
– Main deck (2) assembly list –

Symbol No.	Part No.	Part Name	Description	Q'ty	Symbol No. Position
201	PUM30001-104	Spring		1	3-D
⚠202	PU53994P	Capstan Motor Assembly	M002 Overhaul Part	1	3-E
203	PU45980	Capstan Motor Band		1	2-D
204	PU51324	Feed Through Capacitor	C002, 004	1	2-D
205	LPSP3008Z	Screw		1	2-E
206	PU43730	Tapping Plate		1	2-D
207	PU45811	Ferrite Bead		2	3-D
208	QEN41HM-105	Electrolytic Capacitor	C003 (1 μF, 50 V)	1	2-E
209	LPSP3005Z	Screw		2	2-D
210	PU33273A	Capstan Housing Sub Assembly		1	4-B
211	DPSP3014Z	Screw		3	3-A, B
212	–	Capstan F.G Board	See Section 6.2.22	1	3-A
213	SDST2606Z	Tapping Screw		3	3-B
214	PU33265D	Capstan Flywheel Assembly		1	2-A
215	PU49164	Capstan Belt	Overhaul Part	1	2-B
216	PUM30018-1	Spacer		1	4-B
217	PU52183	Capstan Oil Seal		1	5-B
218	PU51313	Bracket		1	1-B
219	PU47212	Thrust Bearing		1	1-B, 2-B
220	PU48016-2	Mini Clamp		2	1-B
221	SBST3006Z	Tapping Screw		2	1-B
222	PU51341	Brake Arm		1	4-B, C
223	PUM30017-8	Slit Washer		1	3-C
⚠224	PU51873-1-2	Brake Solenoid	PG01	1	2-C
225	PRE3016	Spring Pin		1	1-C
226	PUM30002-21	Spring		1	2-C
227	SBST3006Z	Tapping Screw		2	1-C
228	–	Supply Reel FG Board	(PI 01) See Section 6.2.19	1	2-D
229	–	Take-up Reel FG Board	(PI 02) See Section 6.2.20	1	2-C
230	SBST3008Z	Tapping Screw		2	2-D
231	PU53995	Leaf Switch	S001, 002	1	3-E
232	PU51815	Pick-up Head	H007	1	3-F
233	SPSP2004Z	Screw		2	4-F
234	LPSP3008Z	Screw		2	3-F
235	PU51859A-2	Loarding Gear Assembly		1	1-E
⚠236	PU52503A	Loarding Motor Assembly	M004 Overhaul Part	1	1-E
237	QCF71HP-473	Ceramic Capacitor	C001 (0.047 μF, 50 V)	1	1-E
238	DPSP2605Z	Screw		1	2-F
239	SDSP2605Z	"		1	2-F
240	PU50350	Loarding Belt	Overhaul Part	1	1-E
241	GBST3008Z	Tapping Screw		2	1-E, 2-E
242	PU51369	Back Tension Cancel Plate		1	4-D
243	PUM30001-54	Spring		1	4-D
244	PU51370A	Connect Lever Assembly		1	4-D
245	PU43769-15	Collar		1	4-C
246	DPSP3006Z	Screw		1	4-C
247	PU53462A	Take-up Clutch Assembly	Overhaul Part	1	2-C
248	SPSP3006Z	Screw		2	2-C
249	PUM30003-1	Take-up Clutch Belt	Overhaul Part	1	2-B
250	–	Junction Board	See Section 6.2.28	1	2-C
251	–	Relay Board	See Section 6.2.30	1	4-F
252	PU52784	Locking Circuit Board Supporter		3	3-C, 4-F
253	PU49485	Wire Clamp		1	2-D
254	SBST3006Z	Tapping Screw		1	2-D
255	PU49485-3	Wire Clamp		1	2-D
256	QXT652H-020	Tube		1	4-D, 5-D
⚠257	PU45811	Ferrite Bead		2	1-E

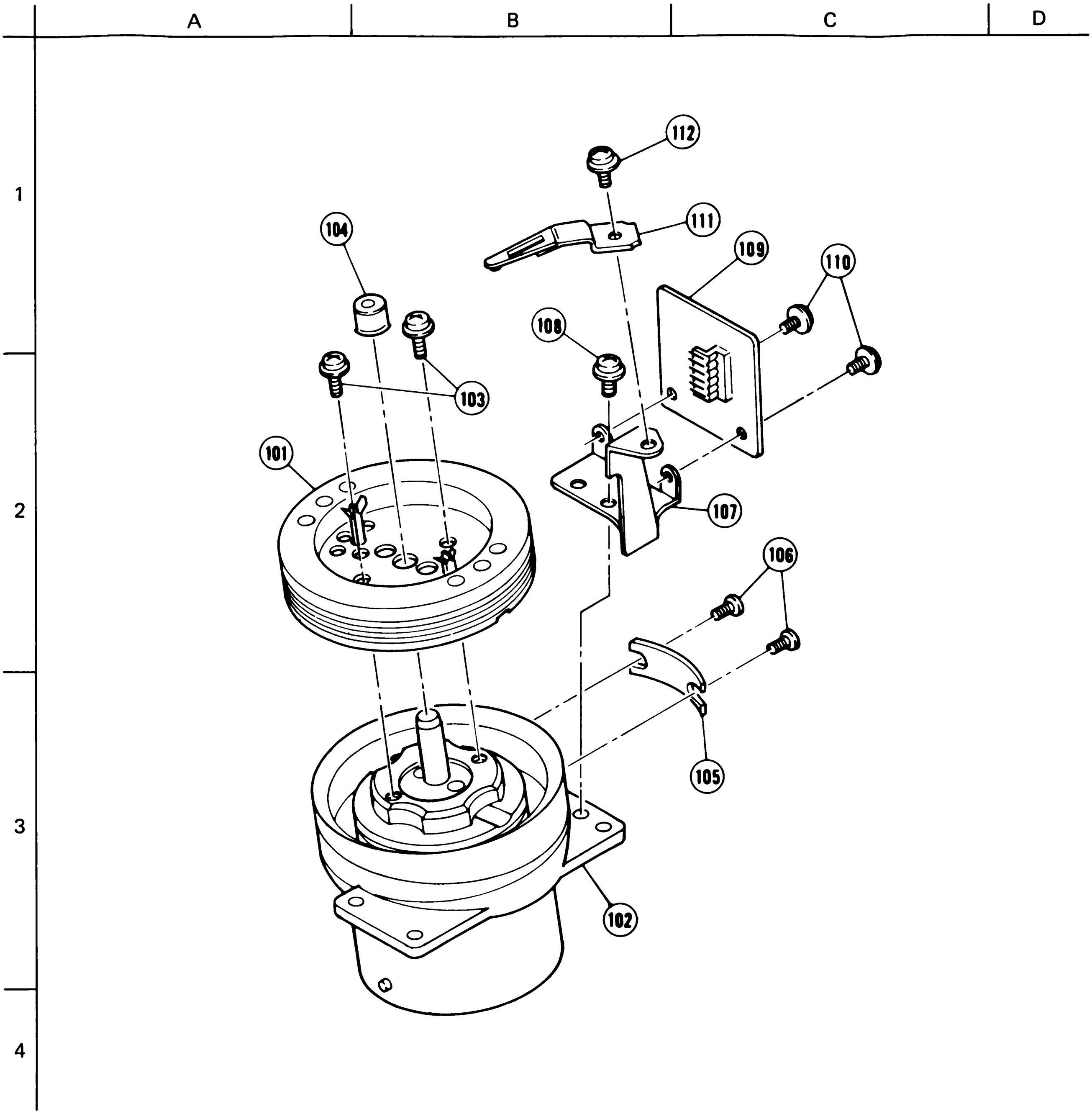
5.2.6 Power transformer assembly



— Power transformer assembly list —

Symbol No.	Part No.	Part Name	Description	Q'ty	Symbol No. Position
⚠ 1	PU33240	Power Trans. Bracket		1	3-C
⚠ 2	PU55179	Power Transformer		1	2-A
3	SBSB4006Z	Tapping Screw		5	1-A, 2-A
4	—	—		—	—
5	—	—		—	—
⚠ 6	QSE1135-007	Power Switch		1	1-B
⚠ 7	PU50479	Power Switch Cover		1	1-B
⚠ 8	LPSP3006Z	Screw		4	1-C
9	—	Fuse Board	See Section 6.2.16	1	2-B
⚠10	E48729-001	Plastic Rivet		1	2-A
⚠11	QMP3960-200B	Power Cord		1	3-D
⚠12	PU51538	Cord Clamp		1	2-D
⚠13	PU48086	Edge Saddle		1	2-B
⚠14	PU48016	Mini Clamp		2	2-C
⚠15	PU52167	Lead Clamp		2	3-B
⚠16	P688-40A2A2LLGS	Wire Assembly		1	2-A
⚠—	PU55180A	Power Transformer Assembly	Incl. ① – ③ and ⑥ – ⑯	—	—

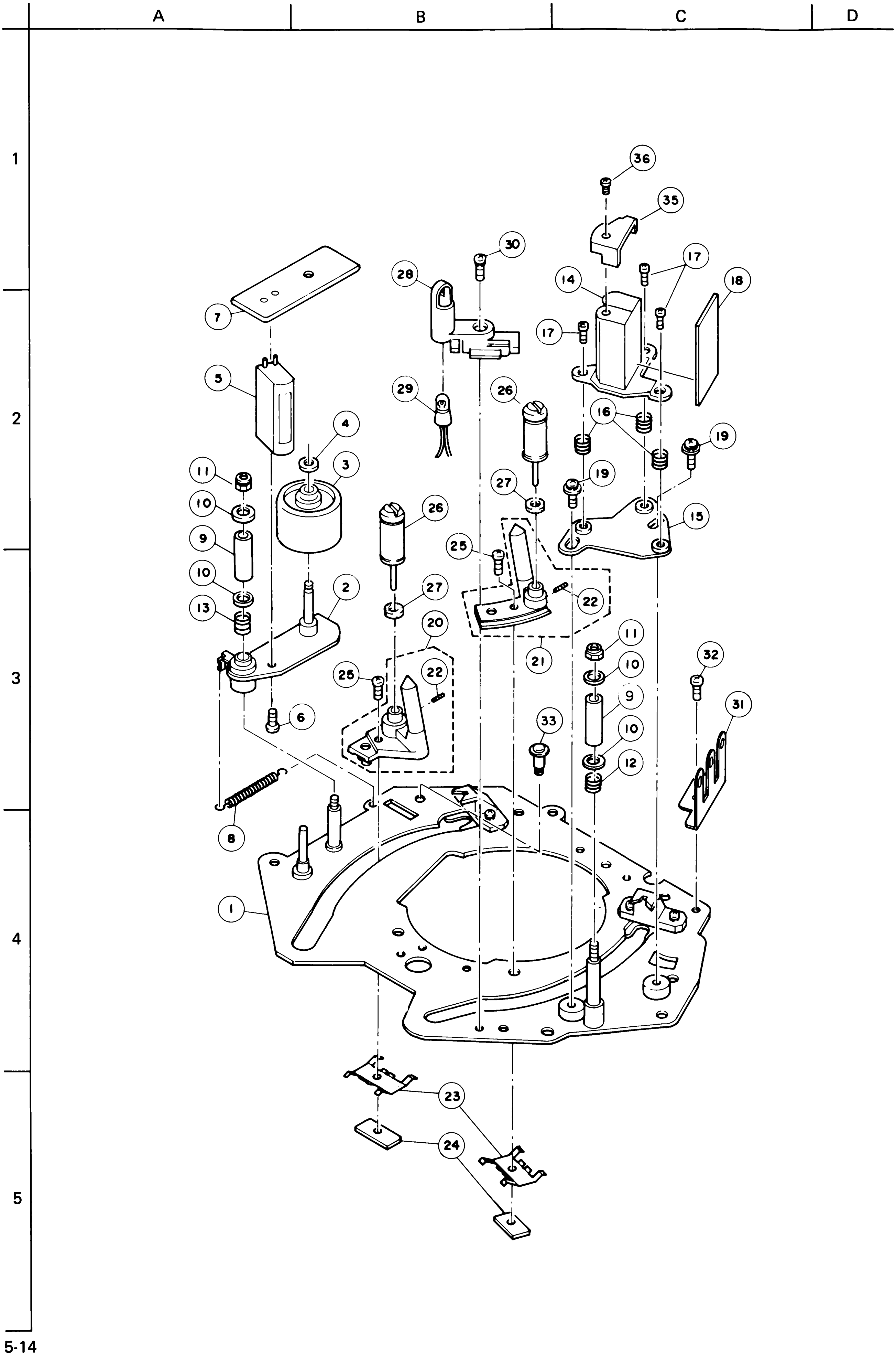
5.2.7 Drum assembly



— Drum assembly list —

Symbol No.	Part No.	Part Name	Description	Q'ty	Symbol No. Position
101	PU31332L	Upper Drum Assembly	(H005, 006) Overhaul Part	1	2-A
⚠102	PUS36293F-7	Lower Drum Assembly	(M001) Incl. (105)	1	3-B
103	NDBP3010N	Screw		2	2-B
104	PU49483	Commutator	Overhaul Part	1	1-A
105	PU48700-7	Heater Assembly	R001 or PU48700-8	1	3-C
106	SDBP3004N	Screw		2	2-C
107	PU52147	Bracket		1	2-C
108	DPSP3006Z	Screw		1	1-B
109	—	Video Head Board	See Section 6.2.5	1	1-C
110	DPSP3006Z	Screw		2	1-C
111	PU48678A	Brush Assembly	Overhaul Part	1	1-C
112	DPSP3006Z	Screw		1	1-C

5.2.8 Sub deck assembly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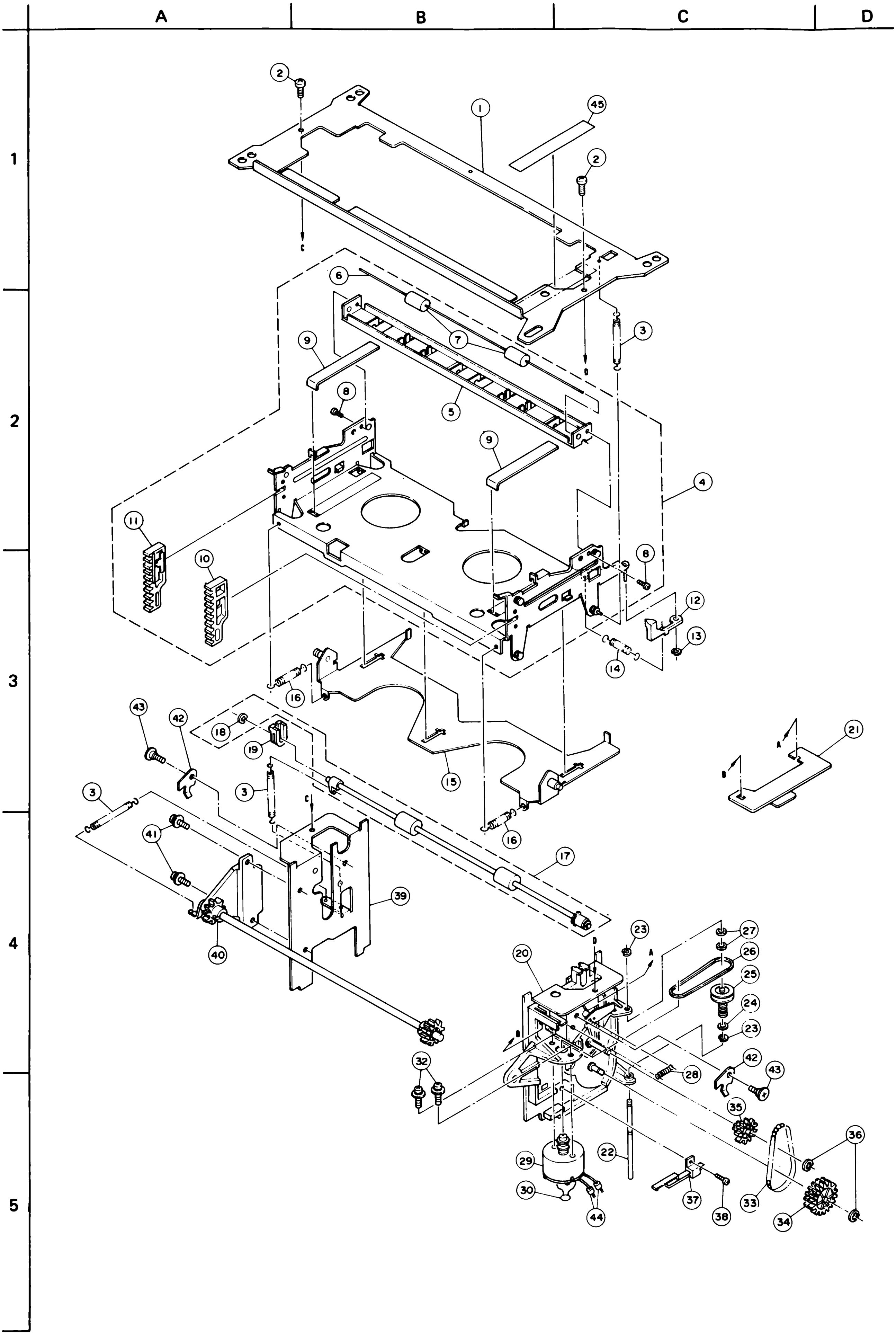
– Sub deck assembly list –

Symbol No.	Part No.	Part Name	Description	Q'ty	Symbol No. Position
1	PUS46182B	Sub Deck Sub Assembly		1	4-A
2	PU52847A	Erase Head Arm Sub Assembly		1	3-B
3	PU51292A	Impedance Roller Assembly		1	2-B
4	PUM30017	Slit Washer		1	2-B
5	PU51263-2	Full Erase Head	H001 Overhaul Part	1	2-A
6	LPSP2004Z	Screw		1	3-B
7	–	Full Erase Head Board	See Section 6.2.3	1	2-A
8	T30300-004	Spring		1	4-A
9	PU53826	Guide Pole		2	2-A, 3-C
10	PU51294	Guide Flange		4	2-A, 3-C
11	PU49276	Nut		2	2-A, 3-C
12	PU30080-49	Spring		1	3-C
13	" -69	"		1	3-A
14	PU51903C	Audio/Control Head Assembly	H002, 003, 004 Overhaul Part	1	1-C
15	PU51296A	Base Assembly		1	2-C
16	PU30080-49	Spring		3	2-C
17	SPSP2608ZY	Screw		3	1-C, 2-B
18	–	Audio/Control Head Board	See Section 6.2.4	1	1-C
19	DPSP3006Z	Screw		2	2-C
20	PQ40171A-1	Supply Pole Base Assembly	Incl. ㉒	1	3-B
21	PQ40172A-1	Take-up Pole Base Assembly	Incl. ㉒	1	3-B
22	YFS3002.5FS	Set Screw		2	3-B, C
23	PU51299	Spring Plate		2	5-B
24	PU51638	Plate		2	5-B
25	SPSP2606Z	Screw		2	2-B, 3-B
26	PU48748B	Guide Roller Assembly		2	2-B
27	PU48806-3	Rubber Tire		2	2-B, 3-B
28	PU48737	Lamp Holder		1	1-B
29	PU49557-3-3	Cassette Lamp	PL01	1	2-B
30	LPSP3006Z	Screw		1	1-B
31	PU51842	Earth Lug		1	3-C
32	LPSP3006Z	Tapping Screw		1	3-C
33	PU54648	Flange Screw		1	3-B
34	–	–		–	–
35	PU54178	Shield Cap		1	1-C
36	HPSP2020N	Screw		1	1-C

5.2.9 Cassette housing assembly



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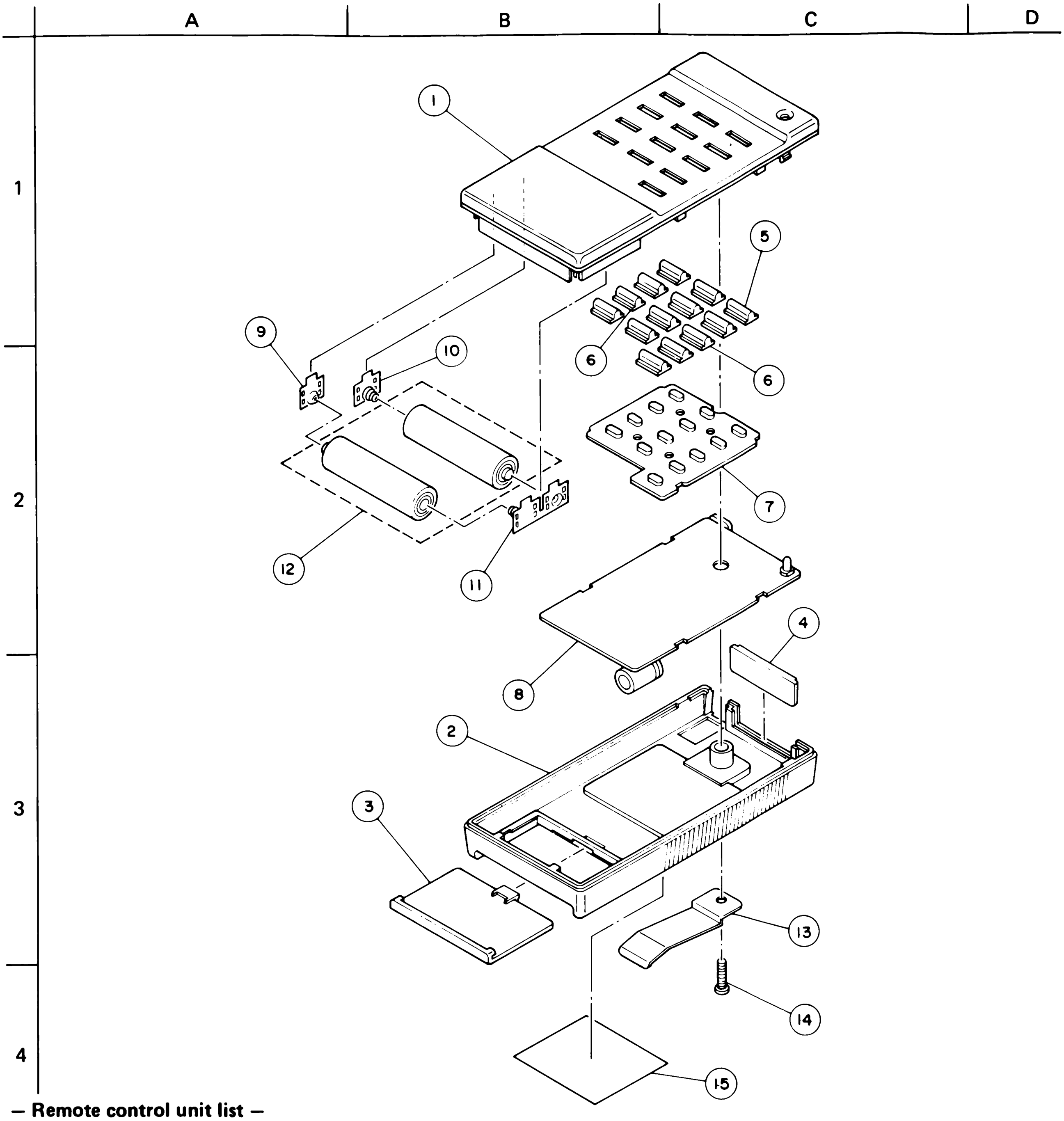
– Cassette housing assembly list –

Symbol No.	Part No.	Part Name	Description	Q'ty	Symbol No. Position
1	PU33100-1-2	Roof Frame		1	1-B
2	SBST3006Z	Tapping Screw		2	1-A, C
3	PUM30001-63	Spring		3	2-C, 3-A
4	PU21221A-2	Cassette Housing Sub Assembly		1	2-C
5	PU33237	Reinforcement		1	2-B
6	PU51870	Rod		1	1-B
7	PU51947	Roller		2	2-B
8	LPSP2006Z	Screw		2	2-B, 3-C
9	PU49001B	Tephron Sheet Assembly		2	2-B
10	PU51614-1-2	Rack Gear (R)		1	3-A
11	PU51614-2-2	" (L)		1	2-A
12	PU49656-1-2	Lid Opener		1	3-C
13	REE2000	E-Ring		1	3-C
14	PU35005-79	Spring		1	3-C
15	PU33096A	Slide Plate Assembly		1	3-B
16	PU35005-17	Spring		2	3-B, 4-B
17	PU49042A	Roller Assembly	Overhaul Part	1	4-C
18	REE3000	E-Ring		1	3-A
19	PU49046	Roller Bearing		1	3-A
20	PU33348B	Guide Stay (R) Assembly		1	4-B
21	–	Cassette Photo Interrupter Board	(PI 03) See Section 6.2.27	1	3-D
22	PU49000	Shaft		1	5-C
23	REE2000	E-Ring		2	4-C
24	Q03093-834	Washer		1	4-C
25	PU49026	Worm Gear		1	4-C
26	PU48941	Belt	Overhaul Part	1	4-C
27	Q03093-834	Washer		2	4-C
28	PU35005-104	Spring		1	4-C
⚠ 29	PU49158B	Cassette Motor Assembly	M005 Overhaul Part	1	5-B
30	QCF11HP-473	Ceramic Capacitor	C008 (0.047 μF, 50 V)	1	5-B
31	–	–		–	–
32	LPSP2605Z	Screw		2	4-B
33	PU49031-3	Ladder Chain		1	5-C
34	PU32937	Sprocket Gear		1	5-C
35	PU49032	Worm Wheel Gear		1	5-C
36	REE2500	E-Ring		2	5-D
37	PU51259-2	Cassette Switch	S004	1	5-C
38	SPSP2004Z	Screw		1	5-C
39	PU51616	Guide Stay (L)		1	4-B
40	PU32453A	Connect Gear Assembly	Incl. ㊶	1	4-A
41	DPSP3006Z	Screw		2	4-A
42	PU49030	Assist. Plate		2	3-A, 4-C
43	PU50039	Fulcrum Screw		2	3-A, 4-C
44	PU45811	Ferrite Bead		2	5-C
45	PU52763	Insulator		1	1-C
–	PUS26216C	Cassette Housing Assembly	Incl. ①–㉚, ㉜–㊺	–	–

5.2.10 Remote control unit



– Remote control unit list –

Symbol No.	Part No.	Part Name	Discription	Q'ty	Symbol No. Position
1	UR52VCS17	Upper Case Assembly		1	1-B
2	UR52CS23	Lower Case		1	3-B
3	UR52EC24	Battery Cover		1	3-B
4	UR52SB26	I.F.R Window Glass		1	2-C
5	UR52BT25	Button	Dark Gray	11	1-C
6	UR52BT25A	"	Red	2	2-B, C
7	UR52CT28	Key-top Rubber		1	2-C
8	–	Remote Control Board Assembly	See Section 6.2.34	1	3-B
9	URC270TD10	Contact Piece		1	1-A
10	URC270VTD3	"		1	2-B
11	URC270VTD4	"		1	2-B
12	–	Battery	See Section 5.2.1	2	2-A
13	–	Hook	See Section 5.2.1	1	3-C
14	XSB26+14FC	Screw		1	4-C
15	UR52LB30B	Lavel		1	4-C
⚠ –	PU52097D	Remote Control Unit	Incl. ① – ⑪ , ⑭ and ⑮	–	–

SECTION 6
ELECTRICAL PARTS LIST

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SAFETY PRECAUTION

Parts identified by the ⚠ symbol are critical for safety. Replace only with specified part numbers.

ABBREVIATIONS IN THIS LIST ARE AS FOLLOWS:

RESISTORS : All resistance values are in ohms (Ω).

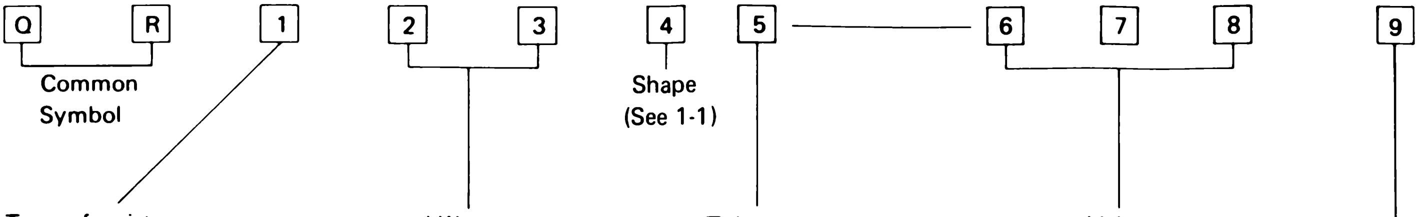
K	1 000
M	1 000 000
CR :	Carbon Resistor
Comp. R:	Composition Resistor
WR	Wire Wound Resistor
OMR	Oxide Metal Film Resistor
VR	Variable Resistor (Potentiometer)
MFR	Metal Film Resistor
FR	Fusible Resistor

CAPACITORS All capacitance values are in μF, unless otherwise indicated

P	μμF
C Cap	Ceramic Capacitor
E Cap	Electrolytic Capacitor (L. L : Low Leakage)
FM Cap	Film Mica Capacitor
MM Cap :	Metalized Mylar Capacitor
MP Cap	Metalized Paper Capacitor
MY Cap :	Mylar Capacitor
NP Cap	Non-polar Capacitor
PC Cap	Polycarbonate Capacitor
PP Cap	Poly Pro Capacitor
PS Cap	Polystyrol Capacitor
T Cap	Tantalum Capacitor
TR Cap	Trimmer Capacitor

6.1 STANDARD PART NUMBER CODING

6.1.1 Fixed Resistor Coding



Type of resistor

C	Composition Resistor
D	Carbon Resistor
F	Unflammable Resistor
G	Oxide Metal Film Resistor
M	Metal Plate Resistor
X	Metal Film Resistor
W	Wire Wound Resistor
Y	Wire Wound Resistor
V	Metal Film Resistor, High Stability
Z	Special Resistor
S	Chip Resistor

Rated Wattage

Symbol	Rated wattage
16	1/6 (W)
18	1/8 "
14	1/4 "
12	1/2 "
01	1 "
02	2 "
03	3 "
04	4 "
05	5 "
06	6 "
07	7 "
75	7.5 "
08	8 "
10	10 "
15	15 "
20	20 "
30	30 "

Tolerance

Symbol	Tolerance
F	±1 %
G	±2 %
J	±5 %
K	±10 %
M	±20 %

Values

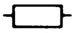
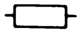
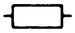
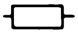
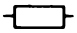
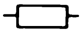
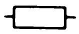
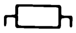
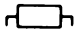
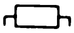
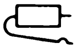
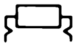
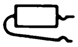
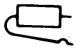
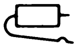
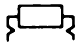
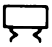
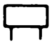
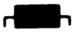
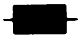
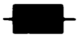
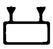
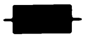
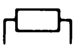
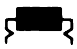
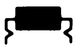
—Example —

R47		0.47 Ω
4R7		4.7 Ω
470	47 x 10^0	47 Ω
471	47 x 10^1	470Ω
472	47 x 10^2	4.7 KΩ
473	47 x 10^3	47 KΩ
474	47 x 10^4	470 KΩ
475	47 x 10^5	4.7 MΩ
10R2		10.2 Ω
1430	143 x 10^0	143 Ω
1581	158 x 10^1	1.58 KΩ

Size

Symbol	Size
A	Small Size
S	Small Size

1-1 Shape of resistor (■ : Flame retardant resistor)

Sort	C	D	G	F	M	W	X	Y	V
1									
2									
3									
4									
5						L type			
6						Resin Covered			
7						Enameled			
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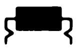
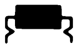
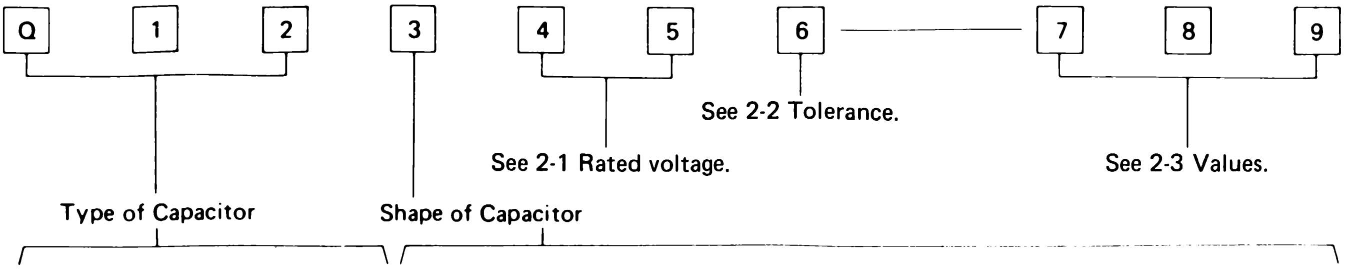
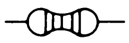
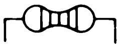
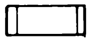
9									

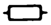
6.1.2 Fixed Capacitor Coding


Q
1
2
3
4
5
6
7
8
9
See 2-2 Tolerance.
See 2-1 Rated voltage.
See 2-3 Values.
Type of Capacitor
Shape of Capacitor

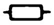
Ceramic Capacitors

Symbol	Type of Capacitor	Disk Lead	Kink Lead			
QCC	Ceramic			4	5	
QCF	"	1	3			
QCS	"	1	3			
QCT	Temperature compensation					
QCX	Special			1	3	
QCY	Ceramic	1, 4	3			8
QCZ	Special					

Electrolytic Capacitors

Symbol	Type of Capacitor	Tubular 	Mono-direction	Anti-stress	Forming	Snap-in
QEA	Characteristic A	2	4			
QEB	Low Leakage		4	5	6	
QED	Characteristic D	2	4			
QEE	Tantalum		4	5		
QEE	" (small type)		8			
QEK	Characteristic W (subminiature type)		4	5		
QEL	Characteristic L					7
QEN	Non-polar	2	4	5	6	
QET	Characteristic W (small type)	2	4	5	6	
QEW	Characterisitc W	2	4	5	6	7
QEZ	Special					

Paper Film Capacitors

Symbol	Type of Capacitor	Tubular 	Normal		Flame retardant	
			Mono-direction	Kink Lead	Mono-direction	Kink Lead
QFF	Film mica		4			
QFH	Metalized mylar	2	4	3	5	6
QFM	Mylar	2	4	3, 7	5	6
QFN	" (small type)		4			
QFP	Polypropylene		4	3		
QFS	Polystyrole	2	4	3		
QFZ	Special					

2-1 Rated voltage (V)

2nd letter / First letter	A	B	C	D	E	F	G	H	J	K	V	W	X
0						3.15			6.3				
1	10		16	20	25		40	50	63		35		
2	100	125	160	200	250	315	400	500	630		350	450	600
3	1000	1250		2000				5000					

2-2 Tolerance

Symbol	F	G	J	K	M	N	Z	P	A	H	R
(%)	± 1	± 2	± 5	± 10	± 20	± 30	+ 80 − 20	+ 100 − 0	+ 100 − 10	+ 50 − 10	+ 30 − 10

2-3 Values

– Example – Values are in picofarads.

101 10×10^1 ..... 100 pF

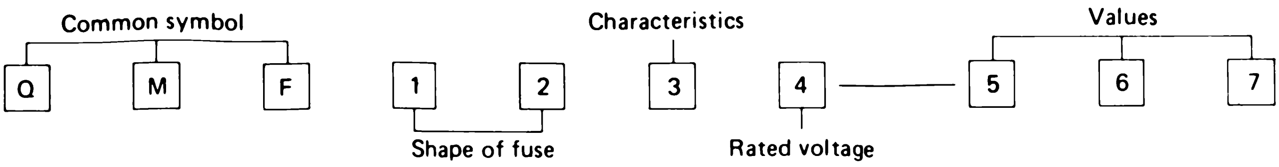
102 10×10^2 ..... 1,000 pF = 0.001 μF

103 ..... 10×10^3 ..... 10,000 pF = 0.01 μF

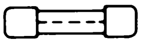
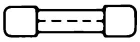
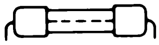
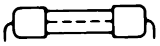
104 10×10^4 ..... 100,000 pF = 0.1 μF

5R0 ..... 5.0 ..... 5 pF

6.1.3 Fuse Coding



Shape of Fuse (first and second digit)

Symbol No.	Shape	Remarks
51		ϕ 5.2 x 20 mm
60		ϕ 6.4 x 30 mm
61		ϕ 6.35 x 31.8 mm
63		With 60 Lead Wire
66		With 61 Lead Wire

Rated Voltage (fourth digit)

Symbol No.	Rated Voltage	
1	AC 125 V	
2	AC 250 V	
3	100 mA ≀ 1 A	AC 250 V
	1.25 A ≀ 6.3 A	AC125 V

Value (fifth – seventh digit)

– Example –

R10 .... 100 mA
R125 .... 125 mA
1R0 .... 1.0 A
1R2 .... 1.2 A
1R25 .... 1.25 A
100 .... 10 A

Characteristics (third digit)

Symbol No.	Fusing Current	Fusing Time	Remarks
S	160%	Within 1 hr.	Anti-rush Type
	200%	〃 2 min.	
	700% – 2000%	〃 0.01 sec.	
R	160%	〃 1 hr.	Regular Fusible Type
	200%	〃 2 min.	
M	135%	〃 1 hr.	Regular Fusible Type (for UL)
	200%	〃 2 min.	
U	135%	〃 1 hr.	Anti-rush Type (for UL)
	200%	〃 2 min.	
	800% – 2000%	〃 0.01 sec.	
A	210%	〃 2 min.	Anti-rush Type (for Europe)
	275%	0.5 – 10 sec.	
	400%	0.15 – 2 sec.	
	1000%	0.02 – 0.3 sec.	
B	210%	Within 30 min.	Regular Fusible Type (for SEMKO, Europe)
	275%	0.05 – 2 sec.	
	400%	0.01 – 0.3 sec.	
C	135%	Within lhr.	Anti-rush Type (for UL, Japan)
	200%	〃 2 min.	

6.2 ELECTRICAL PARTS LIST

6.2.1 Start Sensor Board $\boxed{0}\boxed{1}$

Symbol No.	Part No.	Part Name	Description
	PU51579	Circuit Board	
PT01	PN202S	Photo Transistor	

6.2.2 End Sensor Board $\boxed{0}\boxed{2}$

Symbol No.	Part No.	Part Name	Description
	PU49136	Circuit Board	
PT02	PN202S	Photo Transistor	

6.2.3 Full Erase Head Board $\boxed{0}\boxed{3}$

Symbol No.	Part No.	Part Name	Description
	PU51720	Circuit Board	
	PU43351-102	Cap. Housing	1–2

6.2.4 Audio/Control Head Board $\boxed{0}\boxed{4}$

Symbol No.	Part No.	Part Name	Description
	PU51904	Circuit Board	
R 1	QRD181J-100	CR	
	PU43351-2	Cap. Housing	11–12

6.2.5 Video Head Board $\boxed{0}\boxed{5}$

Symbol No.	Part No.	Part Name	Description
	PU51910	Circuit Board	
	PU43351-106	Cap. Housing	1–6
	PU50766	Test Point	TP-GND, 204, 222, 223
	PX103N-050NNNCN	Wire Ass'y	for Earth

6.2.6 Tuner/IF Board Ass'y $\boxed{0}\boxed{6}$ PU10697B1

Symbol No.	Part No.	Part Name	Description
IC 1	LA7905	Integrated Circuit	
IC 2	M5187P	"	
IC 3	LB1214	"	
IC 4	LA7016	"	
IC 5	UPC358C	"	
Q 1	2SC2636T	Transistor	
Q 2	"	"	
Q 3	"	"	
Q 4	–	–	
Q 5	DTC114F	Transistor	
Q 6	2SC2636R	"	
Q 7	2SC2647C	"	
Q 8	2SC2636T	"	
Q 9	2SC2647C	"	
Q10	DTC114F	"	
Q11	2SC2647C	"	
Q12	"	"	
Q13	"	"	
Q14	"	"	
Q15	DTC114F	"	
Q16	2SC2647C	"	
Q17	–	–	
Q18	2SC2647C	Transistor	
Q19	"	"	
Q20	2SB641S	"	
Q21	2SC2647C	"	
Q22	"	"	
Q23	2SD889R	"	
Q24	"	"	
Q25	2SB598E,F	"	
⚠ Q26	2SB641R	"	
⚠ Q27	DTA114F	"	
Q28	DTC114F	"	
⚠ Q29	DTA114F	"	
Q30	DTC114F	"	
Q31	"	"	
⚠ Q32	2SB641R	"	
Q33	DTA114F	"	
Q34	2SB598E,F	"	
Q35	2SD637R	"	
Q36	DTC144WF	"	
D 1	–	–	
D 2	–	–	
D 3	1SV136TE	Diode	
D 4	–	–	
D 5	1SV124TE	Diode	
D 6	KV1320	"	
D 7	1SS133	"	
D 8	–	–	
D 9	–	–	
D10	–	–	
D11	1SV136TE	Diode	
D12	1SS133	"	
D13	MA840VI-TA	"	
D14	1SS133	"	
D15	MA840VI-TA	"	
D16	1SS133	"	
D17	"	"	
D18	"	"	

Symbol No.	Part No.	Part Name	Description
D19	1SS133	Diode	
D20	"	"	
D21	"	"	
D22	"	"	
R 1	QRD161J-750	CR	
R 2	" -272	"	
R 3	" -752	"	
R 4	" -470	"	
R 5	" -471	"	
R 6	" -750	"	
R 7	" -470	"	
R 8	" -471	"	
R 9	" -470	"	
R10	–	–	
R11	QRD161J-120	CR	
R12	" -101	"	
R13	" -121	"	
R14	" -331	"	
R15	–	–	
R16	–	–	
R17	–	–	
R18	QRD161J-391	CR	
R19	" -222	"	
R20	QVZ3506-104	VR	(S. TRAP)
R21	–	–	
R22	QRD161J-121	CR	
R23	" -681	"	
R24	–	–	
R25	QRD161J-103	CR	
R26	" -103	"	
R27	" -103	"	
R28	–	–	
R29	QRD161J-224	CR	
R30	" -101	"	
R31	" -183	"	
R32	" -333	"	
R33	" -224	"	
R34	" -224	"	
R35	" -272	"	
R36	" -473	"	
R37	" -473	"	
R38	–	–	
R39	–	–	
R40	–	–	
R41	–	–	
R42	–	–	
R43	QRD182J-104	CR	
R44	QRD161J-392	"	
R45	QVZ3506-332	VR	(S. NOISE)
R46	" -103	"	(P. NOISE)
R47	QRD161J-182	CR	
R48	" -224	"	
R49	" -222	"	
R50	" -562	"	
R51	QVZ3506-332	VR	(S.V.LEV.)
R52	QRD161J-102	CR	
R53	QVZ3506-103	VR	(P.V.LEV.)
R54	QRD161J-271	CR	
R55	" -182	"	
R56	" -152	"	
R57	" -152	"	
R58	" -562	"	
R59	" -331	"	
R60	" -101	"	

Symbol No.	Part No.	Part Name	Description
R61	QRD161J-271	CR	
R62	–	–	
R63	–	–	
R64	–	–	
R65	–	–	
R66	QVZ3506-104	VR	(S.A.TRAP)
R67	–	–	
R68	QRD161J-103	CR	
⚠ R69	QRZ0054-100	FR	
R70	–	–	
R71	QRD161J-393	CR	
R72	" -183	"	
R73	" -102	"	
R74	" -271	"	
R75	" -102	"	
R76	" -103	"	
R77	" -223	"	
R78	–	–	
R79	QRD161J-561	CR	
R80	–	–	
R81	QRD161J-471	CR	
R82	QVZ3506-152	VR	(S. COLOR)
R83	QRD161J-153	CR	
R84	" -332	"	
R85	" -123	"	
R86	QVZ3506-103	VR	(S. SYNC)
R87	QRD161J-183	CR	
R88	" -183	"	
R89	" -471	"	
R90	" -391	"	
R91	" -471	"	
R92	" -102	"	
R93	" -271	"	
R94	" -102	"	
R95	" -103	"	
R96	" -273	"	
R97	–	–	
R98	QRD161J-102	CR	
R99	" -122	"	
R100	–	–	
R101	–	–	
R102	QRD161J-152	CR	
R103	" -473	"	
R104	QVZ3506-152	VR	(P. COLOR)
R105	QRD161J-223	CR	
R106	" -752	"	
R107	" -183	"	
R108	" -333	"	
R109	" -561	"	
R110	–	–	
R111	–	–	
R112	–	–	
R113	–	–	
R114	QRD161J-561	CR	
R115	" -123	"	
R116	" -333	"	
R117	" -471	"	
R118	" -151	"	
R119	" -102	"	
R120	–	–	
R121	QRD161J-100	CR	
R122	" -183	"	
R123	" -154	"	
R124	" -332	"	
R125	" -682	"	

Symbol No.	Part No.	Part Name	Description
R126	QRD161J-473	CR	
R127	" -473	"	
R128	" -821	"	
R129	" -122	"	
R130	–	–	
R131	–	–	
R132	QRD161J-153	CR	
R133	" -224	"	
R134	" -222	"	
R135	" -470	"	
R136	" -103	"	
R137	" -473	"	
R138	" -332	"	
R139	" -473	"	
R140	" -103	"	
R141	" -103	"	
R142	" -104	"	
R143	–	–	
R144	QRD161J-102	CR	
R145	" -224	"	
R146	" -103	"	
R147	" -333	"	
R148	" -104	"	
R149	" -122	"	
R150	" -333	"	
R151	–	–	
R152	–	–	
R153	QRD161J-222	CR	
R154	" -102	"	
R155	" -103	"	
R156	" -222	"	
R157	" -103	"	
R158	" -222	"	
R159	" -103	"	
R160	–	–	
R161	QRD161J-103	CR	
R162	" -124	"	
R163	" -124	"	
R164	" -154	"	
R165	" -474	"	
R166	" -272	"	
R167	" -103	"	
R168	" -333	"	
R169	" -474	"	
R170	" -102	"	
R171	" -821	"	
R172	" -102	"	
⚠ R190	PU52108-100K	Posistor	
C 1	QCY31HK-222	C Cap	
C 2	" -222	"	
C 3	QCF31HP-472	"	
C 4	QCY31HK-222	"	
C 5	QCT25CH-3R0	"	
C 6	" -3R0	"	
C 7	QCY31HK-222	"	
C 8	–	–	
C 9	–	–	
C10	QCT25CH-180	C Cap	
C11	–	–	

Symbol No.	Part No.	Part Name	Description
C12	–	–	
C13	QCY31HK-222	C Cap	
C14	QCF31HP-472	"	
C15	QCT25CH-560	"	
C16	QCY31HK-222	"	
C17	QCF31HP-472	"	
C18	–	–	
C19	QCY31HK-222	C Cap	
C20	QCT05CH-120	"	
C21	QCY31HK-222	"	
C22	" -222	"	
C23	QCS31HJ-2R0	"	
C24	" -4R0	"	
C25	QCY31HK-222	"	
C26	" -222	"	
C27	" -222	"	
C28	" -222	"	
C29	QCT25LH-750	"	
C30	QCF31HP-472	"	
C31	QFN31HJ-222	MY Cap	
C32	–	–	
C33	QET61HM-106	E Cap	
C34	QEE61CM-475	T Cap	
C35	QET61HM-106	E Cap	
C36	–	–	
C37	QCT25CH-3R0	C Cap	
C38	" -3R0	"	
C39	QCY31HK-222	"	
C40	" -222	"	
C41	–	–	
C42	–	–	
C43	–	–	
C44	–	–	
C45	QCY31HK-222	C Cap	
C46	QCF31HP-472	"	
C47	QET61CM-337	E Cap	
C48	QET61AM-476	"	
C49	" -476	"	
C50	QCF31HP-472	C Cap	
C51	–	–	
C52	QCS31HJ-270	C Cap	
C53	QEN41AM-476	NP Cap	
C54	QET61AM-476	E Cap	
C55	–	–	
C56	QET61HM-475	E Cap	
C57	QEN41AM-476	NP Cap	
C58	QCS31HJ-390	C Cap	
C59	QCX11EM-153	"	
C60	QCF31HP-472	"	
C61	QET61CM-336	E Cap	
C62	QET61AM-476	"	
C63	–	–	
C64	–	–	
C65	–	–	
C66	QET61AM-476	E Cap	
C67	QCF31HP-223	C Cap	
C68	QET61CM-337	E Cap	
C69	QCY31HK-102	C Cap	
C70	QET61HM-474	E Cap	
C71	QET61AM-227	"	
C72	QET61HM-474	"	
C73	" -475	"	
C74	QCS31HJ-271	C Cap	
C75	QET61HM-106	E Cap	
C76	QCF31HP-103	C Cap	

Symbol No.	Part No.	Part Name	Description
C77	QCS31HJ-470	C Cap	
C78	QET61CM-336	E Cap	
C79	QCF31HP-223	C Cap	
C80	QCS31HJ-150	"	
C81	QFN31HK-104	MY Cap	
C82	QET61CM-336	E Cap	
C83	QEC81CM-106	"	
C84	QET61HM-105	"	
C85	QEB41CM-106	"	
C86	QET61HM-335	"	
C87	QEB41HM-225	"	
C88	QET61HM-106	"	
C89	" -106	"	
C90	QCS41HJ-390	C Cap	
C91	QET61HM-474	E Cap	
C92	QCF31HP-223	C Cap	
C93	QET61AM-476	E Cap	
C94	–	–	
C95	QET61AM-476	E Cap	
C96	–	–	
C97	QCY31HK-222	C Cap	
⚠ L 1	PU53606-1R0	Coil	
⚠ L 2	" -1R0	"	
L 3	PU55191-3R3	"	
L 4	–	–	
L 5	PU53606-120J	Coil	
L 6	" -330J	"	
L 7	" -120	"	
L 8	" -220J	"	
L 9	–	–	
L10	–	–	
L11	PU53223-100JG	Peaking Coil	
T 1	PU55181	IFT	P.S. TRAP
T 2	PU55182-2	"	SAW
T 3	PU55183	"	LLD
T 4	PU51344	"	AFC
T 5	PU51345	"	PIF
T 6	PU55181	"	P.S. TRAP
T 7	PU55184	"	15.625 kHz
SAW 1	PU34106-2	Saw Filter	
CF 1	PU32990-4	Ceramic Filter	6.5 MHz TRAP
CF 2	" -5	"	5.5 MHz TRAP
CF 3	PU32989-8	"	40.4 MHz TRAP
IB-1	PU33106-055	In Line Block	
IB-2	" -055	"	
IB-3	" -055	"	
IB-4	" -055	"	
	PU43135-2-30	Nylon Edging	
	PU21642	Shield Case	
	PU21643	Shield Cover	
	PU34108	Shield Plate (1)	
	PU34318-1-1	" (2)	
⚠	PU32997-12	Tuner	

Symbol No.	Part No.	Part Name	Description
	PU43351-3	Cap. Housing	11–13
	" -5	"	41–45
	" -12	"	21–212
	PU49215-7	"	51–57
	PU43351-3R	"	31–33

6.2.7 Tuner/Timer Control Board Ass'y [0] [7]
.... PU10697A3

Symbol No.	Part No.	Part Name	Description
IC201	–	–	
⚠IC202	MN1204E	Integrated Circuit	
IC203	MB3761M	"	
IC204	UPC358C	"	
IC205	MN1218A	"	
⚠IC206	MB8851AM-270L	"	
⚠IC207	UPD552C-088	"	
IC208	IR2403	"	
IC209	"	"	
IC210	–	–	
IC211	UPD4029C	Integrated Circuit	
IC212	IR2403	"	
Q201	2SD637R	Transistor	
Q202	"	"	
⚠ Q203	2SB643R	"	
⚠ Q204	2SC1983R	"	
D201	–	–	
D202	10E2	Diode	
D203	"	"	
D204	–	–	
D205	HZ6A-1L	Zener Diode	
D206	1SS133	Diode	
D207	"	"	
D208	"	"	
D209	HZ6B-3	Zener Diode	
D210	–	–	
D211	1SS133	Diode	
D212	"	"	
D213	"	"	
D214	SLP-135B	LED	
D215	1SS133	Diode	
D216	"	"	
D217	"	"	
D218	"	"	
D219	"	"	
D220	"	"	
D221	"	"	
D222	"	"	
D223	"	"	
D224	"	"	
D225	"	"	
RA201	EXB-P85333M	Resistor Array	or FRE5333M
RA202	"	"	or "
RA203	EXB-P84333M	"	or FRE4333M
RA204	EXB-P811562M	"	or FRE11562M
RA205	EXB-P812333M	"	or FRE12333M
RA206	EXB-P89333M	"	or FRE9333M
RA207	EXB-P84333M	"	or FRE4333M

Symbol No.	Part No.	Part Name	Description
R201	–	–	
R202	QRD161J-102	CR	
R203	" -153	"	
R204	" -153	"	
R205	" -153	"	
R206	" -153	"	
R207	" -224	"	
R208	" -564	"	
R209	" -222	"	
R210	–	–	
R211	QRD161J-124	CR	
R212	" -154	"	
R213	" -124	"	
R214	" -103	"	
R215	" -223	"	
R216	" -103	"	
R217	" -333	"	
R218	" -103	"	
R219	" -224	"	
R220	–	–	
R221	QRD161J-682	CR	
R222	" -103	"	
R223	" -273	"	
R224	" -103	"	
R225	" -123	"	
R226	" -394	"	
R227	" -333	"	
R228	" -333	"	
R229	" -103	"	
R230	–	–	
R231	QRD161J-222	CR	
R232	" -393	"	
R233	" -393	"	
R234	PU51952	Tuning VR	Incl. S203
R235	QRD161J-223	CR	
R236	" -223	"	
R237	" -103	"	
R238	" -123	"	
R239	" -183	"	
R240	–	–	
R241	QRD161J-333	CR	
R242	" -333	"	
R243	" -333	"	
R244	" -333	"	
R245	" -333	"	
R246	" -333	"	
R247	" -101	"	
R248	" -104	"	
R249	–	–	
R250	–	–	
R251	QRD161J-102	CR	
R252	" -222	"	
R253	" -224	"	
R254	" -472	"	
R255	" -104	"	
R256	" -333	"	
R257	QRD182J-102	"	
R258	QRD161J-104	"	
R259	" -103	"	
R260	–	–	
R261	QRD161J-103	CR	
R262	" -102	"	
R263	" -561	"	
R264	" -561	"	
R265	" -561	"	

Symbol No.	Part No.	Part Name	Description
R266	QRD161J-561	CR	
R267	–	–	
R268	QRD161J-103	CR	
R269	" -101	"	
R270	–	–	
R271	–	–	
R272	QRD161J-391	CR	
R273	–	–	
R274	QRD161J-102	CR	
R275	–	–	
R276	QRD161J-102	CR	
R277	" -102	"	
R278	" -332	"	
R279	" -102	"	
R280	–	–	
R281	QRD161J-103	CR	
R282	" -332	"	
R283	" -333	"	
C201	QET61HR-107	E Cap	
C202	QFN31HK-333	MY Cap	
C203	" -333	"	
C204	" -333	"	
C205	" -333	"	
C206	" -223	"	
C207	" -563	"	
C208	–	–	
C209	QET61HR-105	E Cap	
C210	–	–	
C211	QET61HM-474	E Cap	
C212	QCS31HJ-151	C Cap	
C213	" -471	"	
C214	" -471	"	
C215	QET61ER-475	E Cap	
C216	QET61HR-225	"	
C217	QET61CR-106	"	
C218	QET60JR-107	"	
C219	QFN31HK-563	MY Cap	
C220	–	–	
C221	QFN31HK-563	MY Cap	
C222	QET61HR-225	E Cap	
C223	QFN31HK-563	MY Cap	
C224	QET61CR-477	E Cap	
C225	QFN31HK-563	MY Cap	
C226	" -154	"	
C227	" -393	"	
C228	QET61HR-225	E Cap	
C229	QCT25CH-100	C Cap	
C230	–	–	
C231	–	–	
C232	QCT25CH-150	C Cap	
C233	QAT3001-011	TR Cap	(3.84 MHz)
C234	QFN31HK-103	MY Cap	
C235	QET61CR-106	E Cap	
C236	QCS31HJ-121	C Cap	
C237	" -221	"	
C238	QFN31HK-104	MY Cap	
C239	QET61AR-476	E Cap	
C240	–	–	
C241	–	–	
C242	–	–	
C243	QCF11HP-473	C Cap	
C244	QCS11HJ-101	"	
C245	QCF11HP-473	"	
L201	PU46003-151	Peaking Coil	

Symbol No.	Part No.	Part Name	Description
⚠ CP 1	ICP-F10	Circuit Protector	
X'tal 201	PU51640	Crystal	
CF201	PU50224	Ceramic Filter	
S201	QSS2301-401	Slide Switch	CH PRESET
S202	QSS1201-025	"	AFT
S203	–	Switch	See R234
	PU43351-5	Cap Housing	1–5
	" -104	"	11–14
	" -7	"	21–27
	" -9	"	31–39
	" -3	"	41–43
	" -5	"	51–55
	" -6	"	61–66
	" -8	"	71–78
	PU49215-12	"	81–812
	PU43351-7R	"	91–97
	PU45908-2	Test Pin	TP201–205
	PU50634	LED Spacer	for D214

6.2.8 Display Board Ass'y $\boxed{0}\boxed{8}$ PU21421F

Symbol No.	Part No.	Part Name	Description
IC401	UPD552C-079	Integrated Circuit	
D401	SLR54MT4	LED	
D402	″	″	
D403	″	″	
D404	″	″	
D405	″	″	
D406	″	″	
D407	″	″	
D408	″	″	
D409	″	″	
D410	″	″	
D411	″	″	
D412	″	″	
D413	–	–	
D414	–	–	
D415	–	–	
D416	–	–	
D417	TLS124	LED	
D418	″	″	
D419	″	″	
D420	″	″	
RA401	EXB-P88333M	Resistor Array	
RA402	″	″	
RA403	EXB-P811563M	″	
RA404	″	″	
R401	QRD181J-564	CR	
C401	QET61CM-476	E Cap	
C402	QFN31HK-103	MY Cap	
C403	QCS41HJ-121	C Cap	
C404	QCY61HK-471	″	
CF401	PU53580	Ceramic Filter	
S401	PU52956	Push Switch	
S402	″	″	
S403	″	″	
S404	″	″	
S405	″	″	
S406	″	″	
S407	″	″	
S408	″	″	
S409	″	″	
S410	″	″	
S411	″	″	
S412	″	″	
S413	″	″	
S414	PU53848	″	
S415	″	″	
S416	″	″	
S417	PU53848	Push Switch	
S418	″	″	
S419	″	″	
S420	″	″	
S421	″	″	
S422	″	″	
	PU51911-4	F. Display	
	PU51907A	F.D. Holder Ass'y	
P 1	PU43351-105	Cap. Housing	11–15
P 2	″ -6	″	21–26
P 3	″ -4	″	31–34
P 4	″ -7	″	41–47
P 5	″ -8	″	51–58
P 6	″ -5	″	61–65
	PU33140	LED Spacer	for D401–412
	PU33141	LED Shade	for ″
	PU52348	LED Spacer	for D417–420
	PU43192-4	Binder	

6.2.9 Color Board Ass'y $\boxed{0}\boxed{9}$ PU10586B2

Symbol No.	Part No.	Part Name	Description
IC501	BA7200	Integrated Circuit	
IC502	BA7007	"	
IC503	AN607P	"	
IC504	"	"	
⚠IC601	HA11741	Integrated Circuit	
IC602	BA7007	"	
IC603	UPD4066BC	"	
IC604	"	"	
⚠IC605	"	"	
IC606	BA7001	"	
Q501	2SC2021Q,R,S	Transistor	
Q502	"	"	
Q503	DTC124F	"	
Q504	2SC2021Q,R,S	"	
Q505	2SC2021Q	"	
Q506	"	"	
Q507	2SC2021Q,R,S	"	
Q508	2SC2021Q	"	
Q601	2SC2021Q	Transistor	
Q602	2SC2021Q,R,S	"	
Q603	2SC2021Q	"	
Q604	"	"	
Q605	2SC2021Q,R,S	"	
Q606	–	–	
Q607	2SC2021Q	Transistor	
Q608	2SC2021Q,R,S	"	
Q609	"	"	
Q610	2SC2021Q	"	
Q611	"	"	
Q612	"	"	
Q613	"	"	
Q614	"	"	
D501	1SS133	Diode	
D502	"	"	
D503	"	"	
D504	–	–	
D505	1SS133	Diode	
D506	"	"	
D507	1SS99	"	
D508	"	"	
D509	1SS133	"	
D510	"	"	
D511	"	"	
D601	1SS133	Diode	
D602	–	–	
D603	1SS133	Diode	
D604	–	–	
D605	1SS133	Diode	
D606	"	"	
D607	"	"	
R501	QRD161J-102	CR	
R502	" -102	"	
R503	" -102	"	
R504	" -102	"	
R505	" -472	"	
R506	" -182	"	
R507	" -102	"	
R508	" -331	"	
R509	" -473	"	
R510	QRD161J-223	CR	
R511	" -223	"	
R512	" -473	"	
R513	" -393	"	
R514	–	–	
R515	–	–	
R516	–	–	
R517	–	–	
R518	QRD161J-102	CR	
R519	" -682	"	
R520	" -822	"	
R521	" -102	"	
R522	" -102	"	
R523	" -562	"	
R524	" -562	"	
R525	" -223	"	
R526	" -223	"	
R527	" -473	"	
R528	ERTD2FHL-202S	Thermistor	
R529	QRD161J-272	CR	
R530	" -182	"	
R531	" -332	"	
R532	" -102	"	
R533	" -102	"	
R534	" -823	"	
R535	" -183	"	
R536	" -181	"	
R537	" -222	"	
R538	" -681	"	
R539	" -393	"	
R540	" -333	"	
R541	" -391	"	
R542	" -471	"	
R543	QVZ3506-102	VR	(S. P.B COL.)
R544	QRD161J-182	CR	
R545	QVZ3506-471	VR	(S. REC. COL.)
R546	QRD161J-220	CR	
R547	" -184	"	
R548	" -392	"	
R549	" -682	"	
R550	" -102	"	
R551	" -102	"	
R552	" -104	"	
R553	" -182	"	
R554	QVZ3506-472	VR	(S. DET)
R555	QRD161J-103	CR	
R556	" -562	"	
R557	" -333	"	
R558	" -393	"	
R559	" -181	"	
R560	" -102	"	
R561	" -393	"	
R562	–	–	
R563	QRD161J-332	CR	
R564	" -181	"	
R565	" -332	"	
R601	QRD161J-103	CR	
R602	" -393	"	
R603	" -152	"	
R604	" -393	"	
R605	" -393	"	
R606	" -333	"	
R607	" -153	"	
R608	" -393	"	
R609	" -472	"	
R610	" -274	"	
R611	QVZ3506-223	VR	(VXO (2))

Symbol No.	Part No.	Part Name	Description
R612	QRD161J-472	CR	
R613	" -681	"	
R614	" -122	"	
R615	" -562	"	
R616	QVZ3506-681	VR	(P. P.B COL.)
R617	–	–	
R618	QRD161J-822	CR	
R619	" -392	"	
R620	" -564	"	
R621	QVZ3506-682	VR	(P. CONV. BAL.)
R622	QRD161J-562	CR	
R623	" -472	"	
R624	QVZ3506-103	VR	(P. AFC)
R625	QRD161J-821	CR	
R626	" -272	"	
R627	" -123	"	
R628	" -471	"	
R629	" -471	"	
R630	" -562	"	
R631	" -122	"	
R632	" -151	"	
⚠ R633	QRG129J-331	OMR	
R634	QRD161J-392	CR	
R635	" -392	"	
R636	" -333	"	
R637	" -122	"	
R638	" -102	"	
R639	–	–	
R640	QRD161J-681	CR	
R641	" -271	"	
R642	" -103	"	
R643	" -103	"	
R644	" -223	"	
R645	" -223	"	
R646	" -122	"	
R647	" -273	"	
R648	" -562	"	
R649	" -181	"	
R650	" -152	"	
R651	" -181	"	
R652	" -681	"	
R653	" -821	"	
R654	" -393	"	
R655	" -333	"	
R656	" -272	"	
R657	" -102	"	
R658	" -103	"	
R659	" -103	"	
R660	" -181	"	
R661	" -222	"	
R662	" -222	"	
R663	" -103	"	
R664	" -103	"	
R665	" -562	"	
R666	" -123	"	
R667	" -562	"	
R668	" -222	"	
R669	" -221	"	
R670	" -102	"	
R671	QVZ3506-102	VR	(N. (M) REC. COL.)
R672	QRD161J-223	CR	
R673	" -223	"	
R674	" -681	"	
R675	" -331	"	
R676	" -151	"	

Symbol No.	Part No.	Part Name	Description
R677	–	–	
R678	–	–	
R679	–	–	
R680	–	–	
R681	QRD161J-563	CR	
R682	" -182	"	
R683	QVZ3506-472	VR	(S. (M) DET.)
R684	QRD161J-103	CR	
R685	" -562	"	
R686	" -333	"	
R687	" -393	"	
R688	–	–	
R689	QRD161J-181	CR	
R690	" -102	"	
R691	" -393	"	
R692	" -332	"	
R693	" -181	"	
R694	" -181	"	
R695	" -104	"	
R696	–	–	
R697	QRD161J-103	CR	
R698	" -104	"	
R699	" -272	"	
R700	QVZ3506-102	VR	(N. P.B COL.)
R701	QRD161J-103	CR	
R702	" -682	"	
R703	" -331	"	
R704	" -222	"	
C501	QCS31HJ-101	C Cap	
C502	QCF31HP-103	"	
C503	" -103	"	
C504	QET61AR-476	E Cap	
C505	" -476	"	
C506	QCS31HJ-220	C Cap	
C507	QCS11HJ-2R0	"	
C508	QCF31HP-223	"	
C509	QET61AR-476	E Cap	
C510	–	–	
C511	QET61AR-476	E Cap	
C512	" -476	"	
C513	QFP42AJ-222	PP Cap	
C514	QCF31HP-223	C Cap	
C515	QFN31HJ-104	MY Cap	
C516	QCS31HJ-181	C Cap	
C517	QCF31HP-103	"	
C518	QCS31HJ-101	"	
C519	QFN31HJ-103	MY Cap	
C520	" -103	"	
C521	QCF31HP-223	C Cap	
C522	QET61AR-476	E Cap	
C523	QFN31HJ-103	MY Cap	
C524	QCF31HP-103	C Cap	
C525	QFN31HJ-103	MY Cap	
C526	–	–	
C527	QET61AR-476	E Cap	
C528	" -476	"	
C529	QCS31HJ-331	C Cap	
C530	QCF31HP-103	"	
C531	" -102	"	
C532	" -103	"	
C533	QFN31HJ-473	MY Cap	
C534	QET61HR-225	E Cap	
C535	" -225	"	
C536	QCF31HP-103	C Cap	
C537	QCS31HJ-330	"	
C538	QCF31HP-103	"	
C539	QET61AR-476	E Cap	

Symbol No.	Part No.	Part Name	Description
C540	QCF31HP-223	C Cap	
C541	QET61AR-336	E Cap	
C542	QET61HR-105	"	
C543	QFN31HJ-102	MY Cap	
C544	QET61AR-476	E Cap	
C545	QCF31HP-223	C Cap	
C546	–	–	
C547	QET61CR-106	E Cap	
C548	QCF31HP-103	C Cap	
C549	" -103	"	
C550	–	–	
C551	QCS31HJ-390	C Cap	
C552	QCF31HP-223	"	
C553	QET61AR-476	E Cap	
C554	QCF31HP-223	C Cap	
C601	QCS31HJ-100	C Cap	
C602	QAT3001-009	TR Cap	(P. VXO (1))
C603	QCS31HJ-121	C Cap	
C604	" -121	"	
C605	" -101	"	
C606	QET61AR-476	E Cap	
C607	QCF31HP-223	C Cap	
C608	" -223	"	
C609	QET61AR-476	E Cap	
C610	QCF31HP-223	C Cap	
C611	QFN31HJ-223	MY Cap	
C612	QET61HM-105	E Cap	
C613	QCF31HP-103	C Cap	
C614	" -103	"	
C615	QET61ER-476	E Cap	
C616	QCF31HP-103	C Cap	
C617	QEE41CM-106	T Cap	
C618	QFN31HJ-472	MY Cap	
C619	QCF31HP-103	C Cap	
C620	" -103	"	
C621	QET61HR-225	E Cap	
C622	QCS31HJ-101	C Cap	
C623	" -820	"	
C624	QCT25CH-270	"	
C625	" -220	"	
C626	QFN31HJ-473	MY Cap	
C627	QET61HR-475	E Cap	
C628	QFN31HJ-104	MY Cap	
C629	QET61CM-106	E Cap	
C630	QET61HR-475	"	
C631	QCS31HJ-391	C Cap	
C632	QFN31HJ-332	MY Cap	
C633	QCF31HP-103	C Cap	
C634	" -103	"	
C635	QFN31HJ-224	MY Cap	
C636	QCF31HP-103	C Cap	
C637	–	–	
C638	QCF31HP-103	C Cap	
C639	QET61AR-476	E Cap	
C640	QCF31HP-223	C Cap	
C641	" -103	"	
C642	" -103	"	
C643	" -103	"	
C644	QET61CR-476	E Cap	
C645	QCF31HP-223	C Cap	
C646	" -103	"	
C647	" -103	"	
C648	–	–	
C649	QET61AR-476	E Cap	

Symbol No.	Part No.	Part Name	Description
C650	QCF31HP-223	C Cap	
C651	" -103	"	
C652	–	–	
C653	QCF31HP-103	C Cap	
C654	" -103	"	
C655	–	–	
C656	QET61AR-476	E Cap	
C657	QCF31HP-223	C Cap	
C658	QET61AR-476	E Cap	
C659	QCF31HP-223	C Cap	
C660	QET61AR-336	E Cap	
C661	QCF31HP-102	C Cap	
C662	QET61HR-105	E Cap	
C663	QET61AR-476	"	
C664	QCF31HP-223	C Cap	
C665	QCF11HP-223	"	
C666	QET61CR-106	E Cap	
C667	QCF31HP-103	C Cap	
C668	" -223	"	
C669	QET61AR-476	E Cap	
C670	–	–	
C671	QCF31HP-223	C Cap	
C672	–	–	
C673	–	–	
C674	QCF31HP-103	C Cap	
C675	–	–	
C676	QFN31HJ-563	MY Cap	
C677	–	–	
C678	QCF31HP-103	C Cap	
C679	QET61AR-476	E Cap	
C680	QCS31HJ-270	C Cap	
C681	QEE41AM-335	T.T. Cap	
C682	QCX11EM-103	C Cap	
L501	PU52741	Coil	
L502	PU52742	"	
L503	PU49057	"	
⚠ L504	PU48530-101K	"	
L505	" -560J	"	
L506	PU47051-333	"	
⚠ L507	PU48530-101K	"	
L508	" -390J	"	
L601	PU49057	Coil	
L602	–	–	
⚠ L603	PU48530-101K	Coil	
⚠ L604	" -101K	"	
⚠ L605	" -101K	"	
⚠ L606	" -101K	"	
L607	PU47051-123	"	
L608	" -822	"	
L609	PU48530-680J	"	
DL601	PU51221	2H Delay Line	
DL602	PU54311	1H Delay Line	
HPF501	PU51791	High-Pass Filter	
LPF601	PU50747-2	Low-Pass Filter	
BPF501	PU51790	Band-Pass Filter	
BPF502	PU49406	"	
BPF503	PU52743	"	
BPF601	PU49465	Band-Pass Filter	
BPF602	PU32489	"	
CF501	PU46521	Ceramic Filter	

Symbol No.	Part No.	Part Name	Description
CF601	PU46521	Ceramic Filter	
EQ501	PU52168	Equalizer	
X601	PU31449-7	Crystal	
X602	" -4	"	
	PU43351-3	Cap. Housing	(11–13)
	" -4	"	(21–24)
	" -5	"	(31–35)
	" -2	"	(41–42)
	" -2	"	(51–52)
	" -2	"	(61–62)
	" -2	"	(71–72)
	" -2R	"	(81–82)
	" -3Y	"	(91–93)
	" -2	"	(101–102)
	" -2Y	"	(111–112)
	" -2R	"	(121–122)
	" -2R	"	(131–132)
	" -3R	"	(141–143)
	" -3	"	(151–153)
	" -4R	"	(161–164)
	" -2Y	"	(171–172)
	" -2	"	(181–182)
	" -2	"	(191–192)
	" -2	"	(201–202)
	PU43192-4	Binder	
	PU50766	Test Pin	TP-GND, 501, 502, 505, 521, 522, 523, 524 TP-603, 606, 612, 621, 622, 623, 624, 604

– Color Equalizer Board Ass'y – PU55721A

Q 1	2SC2021Q	Transistor	
Q 2	"	"	
R 1	QRD167J-273	CR	
R 2	" -223	"	
R 3	" -822	"	
R 4	" -122	"	
R 5	" -102	"	
R 6	" -181	"	
C 1	QCF31HP-102	C Cap	
C 2	" -103	"	
C 3	QET61AR-476	E Cap	
C 4	QCF31HP-223	C Cap	
L 1	PU54439	Coil	

6.2.10 Regulator Board Ass'y $\boxed{1}\boxed{0}$ PU21268F

Symbol No.	Part No.	Part Name	Description
⚠ Q 1	2SD637S	Transistor	
Q 2	–	–	
⚠ Q 3	2SD639R,S	Transistor	
Q 4	2SD637R,S	"	
⚠ Q 5	2SD637S	"	
Q 6	–	–	
⚠ Q 7	2SD637S	Transistor	
⚠ Q 8	"	"	
⚠ Q 9	2SD895D,E	"	
⚠ Q10	2SD639R,S	"	
Q11	2SC2655O,Y	"	
⚠ DS 1	D5FB10	Diode Stack	
⚠ DS 2	"	"	
D 1	–	–	
D 2	–	–	
D 3	–	–	
D 4	–	–	
D 5	HZ12C-3L	Zener Diode	
⚠ D 6	1S2076A	Diode	
D 7	HZ7A-1L	Zener Diode	
D 8	10E2	Diode	
⚠ D 9	V03C	"	
⚠ D10	"	"	
⚠ D11	"	"	
⚠ D12	"	"	
D13	HZ12C-3L	Zener Diode	
⚠ D14	1S2076A	Diode	
R 1	–	–	
R 2	QRD181J-182	CR	
R 3	" -470	"	
R 4	" -153	"	
R 5	" -472	"	
R 6	" -223	"	
R 7	" -153	"	
R 8	" -472	"	
R 9	–	–	
R10	–	–	
R11	QRD181J-182	CR	
R12	" -182	"	
R13	" -821	"	
R14	" -102	"	
R15	QVZ3244-102	VR	(12 V ADJ.)
R16	QRD181J-222	CR	
R17	" -222	"	
⚠ R18	" -470	"	
R19	" -223	"	
R20	" -472	"	
R21	" -181	"	
R22	" -472	"	
R23	" -222	"	
C 1	–	–	
⚠ C 2	QCF32HP-103	C Cap	
⚠ C 3	" -103	"	

Symbol No.	Part No.	Part Name	Description
⚠ C 4	QCF32HP-103	C Cap	
⚠ C 5	″ -103	″	
⚠ C 6	QFH52AM-224	MM Cap	
⚠ C 7	QEL71ER-478	E Cap	
C 8	QET61CR-476	″	
C 9	″ -476	″	
C10	–	–	
⚠ C11	QCF32HP-103	C Cap	
⚠ C12	″ -103	″	
⚠ C13	″ -103	″	
⚠ C14	″ -103	″	
⚠ C15	QFH52AM-224	MM Cap	
⚠ C16	QEL71VR-478	E Cap	
C17	QET61VR-107	″	
C18	QFN31HK-103	MY Cap	
C19	″ -562	″	
C20	QET61CR-227	E Cap	
⚠ C21	QCF32HP-103	C Cap	
⚠ C22	″ -103	″	
⚠ C23	″ -103	″	
⚠ C24	″ -103	″	
⚠ C25	QFH52AM-224	MM Cap	
⚠ C26	QEL71VR-478	E Cap	
C27	QET61CR-476	″	
C28	″ -106	″	
⚠ RY 1	PU51258	Relay	
⚠	PU51212	Fuse Clip	for F2–4, F6
	PU50597-06	Cap. Housing	11–16
	PU43351-2R	″	31–32
	″ -3R	″	51–53
	″ -3	″	61–63
	″ -3R	″	71–73
	″ 5	″	81–85
	″ -2	″	91–92
	″ -6	″	101–106
	″ -3Y	″	121–123
	A74138-1	Test Pin	TP1–TP4
	PU43192-4	Binder	

6.2.11 Video Sub Board Ass'y 1 1 . . . . . PU21637A

Symbol No.	Part No.	Part Name	Description
IC 1	M51454L	Integrated Circuit	
IC 2	MB84066BM	″	
IC101	VC2011	Integrated Circuit	
Q 1	2SC2021Q,R,S	Transistor	
Q 2	2SB641Q	″	
Q 3	–	–	
Q 4	2SC2021Q	Transistor	
Q 5	2SC2021Q,R,S	″	
Q 6	2SC2021Q	″	
Q 7	2SC2021Q,R,S	″	
⚠ Q 8	2SB641S	″	
Q101	2SC2021Q,R,S	Transistor	
Q102	″	″	
D 1	1SS133	Diode	
D 2	″	″	
D 3	″	″	
R 1	QRD161J-122	CR	
R 2	″ -821	″	
R 3	″ -392	″	
R 4	″ -222	″	
R 5	″ -391	″	
R 6	″ -392	″	
R 7	″ -391	″	
R 8	″ -391	″	
R 9	″ -471	″	
R10	″ -471	″	
R11	QVZ3244-222	VR	(NOISE CANCEL)
R12	QRD161J-223	CR	
R13	″ -223	″	
R14	″ -272	″	
R15	″ -223	″	
R16	″ -333	″	
R17	″ -102	″	
R18	″ -561	″	
R19	″ -391	″	
R20	″ -683	″	
R21	–	–	
R22	QRD161J-472	CR	
R23	″ -182	″	
R24	″ -391	″	
R25	″ -152	″	
R26	″ -152	″	
R27	″ -102	″	
R28	″ -152	″	
R29	″ -392	″	
R30	″ -182	″	
R31	″ -391	″	
R32	″ -102	″	
R33	″ -152	″	
R34	″ -102	″	
R35	″ -152	″	
R36	″ -104	″	
R37	″ -104	″	
⚠ R38	″ -152	″	

Symbol No.	Part No.	Part Name	Description
R39	QRD161J-103	CR	
R101	QRD161J-123	CR	
R102	″ -103	″	
R103	″ -102	″	
R104	″ -331	″	
R105	″ -102	″	
R106	″ -153	″	
R107	″ -103	″	
R108	″ -223	″	
R109	″ -221	″	
R110	″ -222	″	
R111	″ -333	″	
R112	″ -332	″	
R113	″ -101	″	
R114	″ -152	″	
C 1	QET61AR-476	E Cap	
C 2	QET61HR-105	″	
C 3	QCS31HJ-101	C Cap	
C 4	QCF31HP-223	″	
C 5	QET61AR-476	E Cap	
C 6	QCS31HJ-151	C Cap	
C 7	″ -220	″	
C 8	QET61AR-476	E Cap	
C 9	QET61HR-105	″	
C10	QCF31HP-103	C Cap	
C11	″ -103	″	
C12	QCS31HJ-820	″	
C13	QET61AR-476	E Cap	
C14	″ -476	″	
C15	QCS31HJ-330	C Cap	
C16	″ -680	″	
C17	QET61AR-476	E Cap	
C18	QCS31HJ-121	C Cap	
C19	″ -220	″	
C20	″ -560	″	
C21	PU51163-181	″	
C22	″ -161	″	
C23	QCF31HP-223	″	
C24	QCS31HJ-820	″	
C25	″ -330	″	
C26	PU51163-181	″	
C27	″ -161	″	
C101	QET61AR-476	E Cap	
C102	QCS31HJ-680	C Cap	
C103	″ -330	″	
C104	″ -331	″	
C105	QET61AR-476	E Cap	
C106	QCF31HP-223	C Cap	
C107	QEN61AM-476	NP Cap	
⚠ L 1	PU48530-101K	Coil	
L 2	″ -330J	″	
L 3	″ -391J	″	
L 4	″ -121J	″	
⚠ L 5	″ -101K	″	
⚠ L 6	″ -101J	″	
L 7	″ -121J	″	
⚠ L 8	″ -101J	″	

Symbol No.	Part No.	Part Name	Description
L101	PU48530-180J	Coil	
⚠ L102	″ -101K	″	
LPF 1	PU53474	Filter	
LPF 2	PU53348	″	
EQ 1	PU53475	Equalizer	
EQ 2	PU53349	″	
	PU43351-6	Cap. Housing	(11–16)
	″ -3	″	(21–23)
	″ -3	″	(31–33)
	″ -5	″	(41–45)
	″ -2	″	(51–52)
	PU50766	Test Pin	TP1, TP-GND

6.2.12 Mechacon Board Ass'y 1 2 ..... PU10656D

Symbol No.	Part No.	Part Name	Description
IC 1	M51014L	Integrated Circuit	
⚠ IC 2	M50127AP	"	
IC 3	M50786SP	"	or M50782SP
IC 4	"	"	or TMS1025N2LL
⚠ IC 5	UPD553C-210	"	or UPD553C-185
IC 6	UPC339C	"	
IC 7	M54519P	"	
IC 8	"	"	
IC 9	"	"	
IC10	UPD4050C	"	
⚠ IC11	M54519P	"	
IC12	"	"	
⚠ IC13	"	"	
IC14	M54532P	"	
⚠ IC15	M54544L	"	
⚠ Q 1	2SA1020O,Y	Transistor	
⚠ Q 2	"	"	
⚠ Q 3	"	"	
⚠ Q 4	"	"	
⚠ Q 5	"	"	
⚠ Q 6	"	"	
⚠ Q 7	"	"	
⚠ Q 8	"	"	
⚠ Q 9	"	"	
Q10	–	–	
Q11	–	–	
Q12	–	–	
Q13	–	–	
⚠ Q14	2SC2877O,Y	Transistor	
⚠ Q15	"	"	
Q16	2SD637R	"	
Q17	"	"	
Q18	–	–	
Q19	–	–	
Q20	2SD637R	Transistor	
Q21	–	–	
Q22	2SB641Q	Transistor	
Q23	2SK34C	FET	
D 1	PH302	Photo Diode	for Infrared Receiver
D 2	1S2473	Diode	
D 3	"	"	
D 4	"	"	
D 5	"	"	
D 6	"	"	
D 7	"	"	
D 8	"	"	
D 9	"	"	
D10	"	"	
D11	"	"	
D12	"	"	
D13	"	"	
D14	"	"	
D15	"	"	
D16	W03C	"	
D17	"	"	
D18	"	"	
D19	"	"	
D20	W03C	Diode	
D21	"	"	
D22	"	"	
D23	"	"	
D24	HZ9B-3L	Zener Diode	
D25	HZ16-2L	"	
D26	HZ7B-2L	"	
D27	1S2473	Diode	
D28	–	–	
D29	1S2473	Diode	
D30	"	"	
D31	–	–	
D32	–	–	
D33	1S2473	Diode	
D34	HZ12C-3L	Zener Diode	
D35	–	–	
D36	1S2473	Diode	
D37	"	"	
D41	RD20EB2	Zener Diode	
D47	MA150	Diode	
RA 1	EXB-P84333M	Resistor Array	
RA 2	"	"	
RA 3	"	"	
RA 4	"	"	
RA 5	EXB-P812333M	"	
RA 6	EXB-LD6103G	"	
R 1	QRD181J-102	CR	
R 2	" -104	"	
R 3	QRD142J-102	"	
R 4	" -102	"	
R 5	QRD181J-223	"	
R 6	" -473	"	
R 7	" -333	"	
R 8	" -334	"	
R 9	" -473	"	
R10	" -101	"	
R11	" -272	"	
R12	" -223	"	
R13	" -273	"	
R14	" -223	"	
R15	" -104	"	
R16	" -103	"	
R17	" -104	"	
R18	" -103	"	
R19	" -564	"	
R20	" -102	"	
R21	" -333	"	
R22	" -104	"	
R23	" -333	"	
R24	QRV147F-103S	MFR	
R25	QRD181J-103	CR	
R26	" -104	"	
R27	" -103	"	
R28	" -104	"	
R29	" -102	"	
R30	" -102	"	
R31	" -103	"	
R32	" -103	"	
R33	" -103	"	
R34	" -103	"	

Symbol No.	Part No.	Part Name	Description
R35	QRD181J-472	CR	
R36	" -103	"	
R37	" -103	"	
R38	" -472	"	
R39	" -103	"	
R40	" -103	"	
R41	" -103	"	
R42	" -103	"	
R43	" -103	"	
R44	" -103	"	
R45	" -103	"	
R46	" -103	"	
R47	" -103	"	
R48	–	–	
R49	–	–	
R50	QRD181J-102	CR	
R51	" -102	"	
R52	" -102	"	
R53	" -102	"	
R54	" -102	"	
R55	–	–	
R56	–	–	
R57	QRD181J-103	CR	
R58	" -103	"	
R59	" -103	"	
R60	" -103	"	
R61	–	–	
R62	–	–	
R63	QRD181J-103	CR	
R64	" -103	"	
R65	" -333	"	
R66	–	–	
R67	QRD181J-103	CR	
R68	" -104	"	
R69	" -103	"	
R70	" -333	"	
R71	" -105	"	
R72	" -105	"	
R73	" -103	"	
R74	–	–	
R75	QRD181J-103	CR	
R76	" -473	"	
R77	" -822	"	
R78	" -822	"	
R79	" -333	"	
R80	–	–	
⚠ R81	QRG019J-470S	OMR	
⚠ R82	" -680S	"	
R83	QRD122J-102	CR	
R84	" -222	"	
R85	" -102	"	
R86	" -222	"	
R87	–	–	
R88	–	–	
R89	–	–	
R90	QRD181J-392	CR	
R91	" -102	"	
R92	" -104	"	
R93	" -471	"	
R94	–	–	
R95	QRD181J-103	CR	
R96	–	–	
R97	QRD182J-103	CR	
R98	–	–	
R99	–	–	
R100	QRD181J-223	CR	

Symbol No.	Part No.	Part Name	Description
C 1	QEK61CM-226	E Cap	
C 2	" -226	"	
C 3	QET61CM-226	"	
C 4	QET61EM-476	"	
C 5	QEK61HM-105	"	
C 6	" -105	"	
C 7	QET61HM-105	"	
C 8	" -105	"	
C 9	QFN31HK-472	MY Cap	
C10	" -103	"	
C11	QET61CM-106	E Cap	
C12	" -106	"	
C13	" -106	"	
C14	QFN31HK 103	MY Cap	
C15	" -333	"	
C16	" -333	"	
C17	QCS31HJ-471	C Cap	
C18	" -121	"	
C19	" -331	"	
C20	" -101	"	
C21	" -101	"	
C22	QEK61CM-226	E Cap	
C23	QEE41CM-106	T Cap	
C24	QET61CM-476	E Cap	
C25	–	–	
C26	QCC51CN-223	C Cap	
C27	PU54342	"	0.1 500 V
C28	–	–	
C29	–	–	
C30	QCS11HJ-473	C Cap	
C31	–	–	
C32	PU54342	C Cap	0.1 500 V
C33	"	"	0.1 "
IB 1	PU33106-016	Inline Block	
IB 2	" -015	"	
CF 1	PU50224	Ceramic Filter	
CF 2	PU49487	"	
	PU43351-9	Cap. Housing	1–9
	" -20	"	11–30
	" -7	"	31–37
	" -6	"	41–46
	" -7	"	51–57
	" -6	"	61–66
	" -12	"	71–82
	" -2	"	91–92
	PU51945-10	Housing	101–110
	" -20	"	111–130
	PU43351-7	Cap. Housing	141–147
	" -7	"	151–157
	PU50259	Stand of Clip	
	PU51942	Shield Case (1)	
	PU51943	" (2)	for Top
	PU51944-1-4	" (3)	for Bottom
⚠	PU33328	Heat Sink	for Q14, Q15
	PU45375-3	Transistor Spacer	
	GPST3006Z	Tap. Screw	
	SBST3006Z	"	

6.2.13 Operation Board Ass'y 1 3 ..... PU10434A

Symbol No.	Part No.	Part Name	Description
IC 1	M50115AP	Integrated Circuit	
Q 1	2SD636O,R	Transistor	
D 1	1S2473	Diode	
D 2	HZ7B-2L	Zener Diode	
D 3	HZ6C-2L	"	
D 4	1S2473	Diode	
D 5	"	"	
D 6	"		
D 7	W03C		
D 8	"		
D 9			
D10	–	–	
D11	SLR34MT5	LED	
D12	GL3HD5	"	
D13	SLR34MT5		
D14	GL3HD5		
D15	"		
D16	"		
D17	"		
D18			
D19			
D20			
D21			
D22			
D23			
D24			
D25			
D26			
D27			
R 1	ORD181J-102	CR	
R 2	" -102	"	
R 3	" -333	"	
R 4	" 154	"	
R 5	" -821	"	
R 6	" -821	"	
R 7	" -821	"	
R 8	" -821	"	
R 9	" -821	"	
R10	" -821	"	
R11	" -821	"	
R12	" -821	"	
R13	" -821	"	
R14	" -821	"	
R15	" -821	"	
R16	" -821	"	
R17	" -821	"	
R18	" -821	"	
R19	" -821	"	
R20	" -821	"	
R21	" -821	"	
C 1	QET61HR-335	E Cap	
C 2	QCS61HJ-221	C Cap	
C 3	" -221	"	

Symbol No.	Part No.	Part Name	Description
CF 1	PU49487-2	Ceramic Filter	
S 1	OSL2318-009	Lever Switch	Sub power
S 2	PU51189	Tact Switch	
S 3	"	"	
S 4	"	"	
S 5	"		
S 6	"		
S 7	"		
S 8	"		
S 9	"		
S10	"		
S11	"		
S12	"		
S13	–	–	
S14	QSL0011-002	Lever Switch	
	PU43351-120	Cap. Housing	1–20
	" 103	"	21–23
	" -102	"	31–32
	PU50634	LED Spacer	for D12, D14–D27
	PU52427	"	for D11, D13

6.2.14 Servo Board Ass'y $\boxed{1}\boxed{4}$ PU10587B

Symbol No.	Part No.	Part Name	Description
IC 1	BA6305	Integrated Circuit	
IC 2	BA6302A	"	
IC 3	MB84066BM	"	
IC 4	UPC1458C	"	
⚠ IC 5	M54544L	"	
⚠ IC 6	UPD553C-237	"	
⚠ IC 7	BA851A	"	
IC 8	UPC4558C	"	
IC 9	MB84066BM	"	
IC10	BA6302A	"	
IC11	–	–	
IC12	MB84066BM	Integrated Circuit	
IC13	MB3614	"	
⚠ IC14	HA13008	"	
IC15	UPC4558C	"	
IC16	BA222V	"	
IC17	UPC393C	"	
IC18	M54519P	"	
IC19	"	"	
Q 1	2SB641R,S	Transistor	
Q 2	2SD636R,S	"	
Q 3	"	"	
Q 4	–	–	
Q 5	2SB641R,S	Transistor	
Q 6	2SD636R,S	"	
Q 7	"	"	
Q 8	"	"	
Q 9	"	"	
Q10	"	"	
Q11	2SB641R,S	"	
Q12	"	"	
D 1	1S2473	Diode	or MA150
D 2	"	"	"
D 3	"	"	"
D 4	"	"	"
D 5	"	"	"
D 6	"	"	"
D 7	"	"	"
D 8	"	"	"
D 9	"	"	"
D10	HZ6A-1L	Zener Diode	
D11	HZ16-2L	"	
D12	1S2473	Diode	or MA150
D13	"	"	"
D14	"	"	"
D15	–	–	
D16	1S2473	Diode	or MA150
D17	"	"	"
D18	"	"	"
D19	"	"	"
D20	"	"	"
D21	"	"	"
D22	"	"	"
D23	"	"	"
D24	HZ5C-2	Zener Diode	
D25	1S2473	Diode	or MA150
D26	"	"	"
D27	"	"	"
D28	"	"	"
D29	"	"	"
D30	"	"	"
D31	1S2473	Diode	or MA150
D32	"	"	"
D33	"	"	"
D34	"	"	"
D35	"	"	"
D36	"	"	"
D37	"	"	"
D38	"	"	"
D39	"	"	"
D40	"	"	"
D41	"	"	"
D42	"	"	"
D43	"	"	"
D44	"	"	"
D45	"	"	"
D46	"	"	"
D47	"	"	"
D48	"	"	"
D49	"	"	"
D50	"	"	"
D51	RD20EB3	Zener Diode	
⚠ D52	"	"	or RD22FB1
⚠ D53	RD4.7EB1	"	
D54	1S2473	Diode	or MA150
R 1	–	–	
R 2	QRD181J-272	CR	
R 3	" -331	"	
R 4	" -334	"	
R 5	" -103	"	
R 6	" -103	"	
R 7	" -102	"	
R 8	" -394	"	
R 9	" -103	"	
R10	" -103	"	
R11	" -154	"	
R12	QVZ3501-104	VR	(N. CAP. DISCRI)
R13	QRV141F-6652	OMR	
R14	QVZ3501-104	VR	(P. CAP DISCRI)
R15	QRV141F-1183	OMR	
R16	QRD181J-104	CR	
R17	" -564	"	
R18	" -155	"	
R19	" -473	"	
R20	" -103	"	
R21	" -102	"	
R22	" -102	"	
R23	" -103	"	
R24	" -183	"	
R25	" -824	"	
R26	" -272	"	
R27	" -183	"	
R28	" -684	"	
R29	" -473	"	
R30	" -182	"	
R31	" -103	"	
R32	QVP4AOB-103	VR	(N. SLOW P. LEV.)
R33	QRD181J-223	CR	
R34	" -223	"	
R35	QVP4AOB-154	VR	(P. SLOW P. LEV.)
R36	QRD181J-563	CR	
R37	" -273	"	
R38	" -273	"	
R39	" -124	"	
R40	QVP4AOB-154	VR	(PAL PRESET)
R41	QRD181J-393	CR	

Symbol No.	Part No.	Part Name	Description
R42	QVP4AOB-154	VR	(N. PRESET)
R43	QRV141F-1623	MFR	
R44	PU51884	VR	(X2/STD TRACKING)
R45	QRV141F-5112	MFR	
R46	QRD181J-393	CR	
R47	QRV141F-1963	MFR	
R48	–	–	
R49	QRD181J-104	CR	
R50	" -334	"	
R51	" -334	"	
R52	" -684	"	
R53	" -332	"	
R54	" -104	"	
R55	" -103	"	
R56	QVP4AOB-473	VR	(D. PU. P. LEVEL)
R57	QRD181J-223	CR	
R58	QVZ3501-224	VR	(CH-2 SW)
R59	QRD181J-224	CR	
R60	" -223	"	
R61	QVZ3501-224	VR	(CH-1 SW)
R62	QRD181J-224	CR	
R63	" -273	"	
R64	" -224	"	
R65	QVP4A0B-104	VR	(CH-2 V.D)
R66	QRD181J-153	CR	
R67	" -153	"	
R68	PU51885	VR	(CH-1 V.P)
R69	QRD181J-153	CR	
R70	" -153	"	
R71	" -274	"	
R72	" -104	"	
R73	QVZ3501-224	VR	(REC SW)
R74	QRD181J-683	CR	
R75	" -225	"	
R76	" -394	"	
R77	" -682	"	
R78	" -822	"	
R79	" -563	"	
R80	" -103	"	
R81	" -103	"	
R82	" -103	"	
R83	" -333	"	
R84	" -681	"	
R85	" -123	"	
R86	" -224	"	
R87	" -563	"	
R88	" -103	"	
R89	–	–	
R90	–	–	
R91	QRD181J-103	CR	
R92	" -224	"	
R93	" -332	"	
R94	" -333	"	
R95	" -472	"	
R96	" -474	"	
R97	QRV143F-2552	MFR	
R98	QRD181J-682	CR	
R99	QRD183J-104	"	
R100	QVZ3501-683	VR	(P.D. DISCRI)
R101	QRV141F-1433	MFR	
R102	QVZ3501-473	VR	(N.D. DISCRI)
R103	QRD181J-225	CR	
R104	" -103	"	
R105	" -103	"	

Symbol No.	Part No.	Part Name	Description
R106	QRD181J-103	CR	
R107	QVP4AOB-103	VR	(H DISCRI)
R108	–	–	
R109	QRD181J-104	CR	
R110	–	–	
R111	QRD181J-562	CR	
R112	" -823	"	
R113	" -102	"	
R114	" -105	"	
R115	" -683	"	
R116	" -393	"	
R117	" -393	"	
R118	" -393	"	
R119	" -184	"	
R120	" -683	"	
R121	" -152	"	
R122	" -471	"	
R123	" -103	"	
R124	" -223	"	
R125	" -181	"	
R126	" -270	"	
R127	QRX019J-R82S	MFR	
R128	QRD181J-103	CR	
R129	" -181	"	
R130	" -270	"	
R131	" -331	"	
R132	" -331	"	
R133	" -681	"	
R134	" -104	"	
R135	" -103	"	
R136	QVP4AOB-224	VR	(N. PRESET)
R137	" -334	"	(P. PRESET)
R138	QRD181J-124	CR	
R139	PU51884	VR	(SLOW TRACKING)
R140	QRD181J-473	CR	
R141	QVP4AOB-152	VR	(FM. NOISE WIDTH)
R142	QRD181J-123	CR	
R143	" -104	"	
R144	" -225	"	
R145	" -475	"	
R146	" -333	"	
R147	" -333	"	
R148	" -103	"	
R149	" -101	"	
R150	PU51885	VR	(SLOW SPEED)
R151	QRD181J-821	CR	
R152	" -333	"	
R153	" -823	"	
R154	" -473	"	
R155	" -102	"	
R156	" -473	"	
R157	" -473	"	
R158	" -102	"	
R159	" -103	"	
R160	" -103	"	
R161	" -103	"	
R162	" -103	"	
R163	" -473	"	
R164	" -473	"	
R165	" -473	"	
R166	" -473	"	
R167	" -104	"	
R168	" -471	"	

Symbol No.	Part No.	Part Name	Description
R169	QRD181J-103	CR	
R170	" -153	"	
R171	" -103	"	
R172	" -272	"	
R173	" -103	"	
R174	" -273	"	
R175	" -103	"	
R176	" -392	"	
R177	" -392	"	
R178	" -473	"	
R179	" -154	"	
R180	" -104	"	
⚠ R181	" -105	"	
⚠ TH-1	PU52108-2R2	Posistor	
C 1	QET61CM-476	E Cap	
C 2	" -226	"	
C 3	" -476	"	
C 4	QCY61HK-102	C Cap	
C 5	QET61CM-106	E Cap	
C 6	QCX11EM-153	C Cap	
C 7	QET61CM-106	E Cap	
C 8	QFN31HJ-104	MY Cap	
C 9	QET61CM-226	E Cap	
C10	QCY61HK-122	C Cap	
C11	QFN31HK-183	MY Cap	
C12	" -103	"	
C13	QFM71HJ-823	"	
C14	–	–	
C15	–	–	
C16	QEB61CM-106	LL Cap	
C17	" -106	"	
C18	QEN61HM-106	NP Cap	
C19	QET61HM-475	E Cap	
C20	QEN61HM-475	NP Cap	
C21	QET61VM-476	E Cap	
C22	QET61CM-476	"	
C23	QFM71HJ-124	MY Cap	
C24	" -104	"	
C25	" -124	"	
C26	" -473	"	
C27	QFN31HK-473	"	
C28	QCY61HK-102	C Cap	
C29	" -331	"	
C30	QFN31HK-124	MY Cap	
C31	QCX11EM-153	C Cap	
C32	QET61CM-106	E Cap	
C33	QFM71HJ-822	MY Cap	
C34	" -822	"	
C35	" -222	"	
C36	QFN31HK-103	"	
C37	" -103	"	
C38	" -102	"	
C39	QFM71HJ-393	"	
C40	QFN31HK-393	"	
C41	QCY61HK-331	C Cap	
C42	QFM71HJ-223	MY Cap	
C43	QCV11HK-472	C Cap	
C44	QCY61HJ-471	"	
C45	QFN31HK-104	MY Cap	
C46	" -123	"	
C47	" -123	"	
C48	QEN61CM-106	NP Cap	
C49	QFN31HK-562	MY Cap	
C50	QET61CM-337	E Cap	
C51	–	–	
C52	QET61CM-106	E Cap	
C53	QFN31HK-333	MY Cap	
C54	QET61CM-226	E Cap	
C55	–	–	

Symbol No.	Part No.	Part Name	Description
C56	QCX11EM-103	C Cap	
C57	QFP42AJ-152	PP Cap	
C58	" -222	"	
C59	QFN31HK-102	MY Cap	
C60	QCY61HJ-102	C Cap	
C61	" -102	"	
C62	–	–	
C63	–	–	
C64	–	–	
C65	–	–	
C66	–	–	
C67	QEK51HM-106	E Cap	
C68	QEB51CM-106	"	
C69	QFN31HK-473	MY Cap	
C70	" -104	"	
C71	" -392	"	
C72	QCV11HK-222	C Cap	
C73	QEN61HM-475	NP Cap	
C74	QET61HM-225	E Cap	
C75	QEN61HM-475	NP Cap	
C76	QFN31HK-103	MY Cap	
C77	QET61CM-107	E Cap	
C78	" -336	"	
C79	QEN61HM-474	NP Cap	
C80	QET61CM-226	E Cap	
C81	" -106	"	
C82	QET61HM-474	"	
C83	QFN31HK-104	MY Cap	
C84	QET60JM-476	E Cap	
C85	QET61EM-475	"	
C86	QCY61HK-102	C Cap	
C87	QFN31HK-683	MY Cap	
C88	QET61CM-106	E Cap	
C89	QCY61HJ-102	C Cap	
C90	QEK51HM-474	E Cap	
C91	QET61HM-475	"	
C92	QCS41HJ-121	C Cap	
C93	QCY61HJ-331	"	
C94	QEE51CM-106	T Cap	
C95	QFN31HK-473	MY Cap	
C96	QEK51HM-474	E Cap	
C97	" -474	"	
C98	QCF31HP-102	C Cap	
C99	QCY61HK-102	"	
C100	QCF31HP-102	"	
C101	QFN31HK-393	MY Cap	
C102	QCF31HP-102	C Cap	
C103	QFN31HJ-334	MY Cap	
C104	QEN61HM-105	NP Cap	
C105	–	–	
C106	QFN31HK-124	MY Cap	
C107	–	–	
C108	QET61CM-226	E Cap	
C109	QCX11EM-103	C Cap	
C110	QFN31HK-103	MY Cap	
C111	" -103	"	
C112	" -103	"	
C113	" -102	"	
C114	QFN31HJ-393	"	
C115	QET61HM-105	E Cap	
C116	" -105	"	
C117	" -105	"	
C118	QCV11HK-182	C Cap	
C119	QCY61HK-102	"	
C120	QCX11EM-103	"	
X 1	PU47701	Crystal	
CF 1	PU50224	Ceramic Filter	

Symbol No.	Part No.	Part Name	Description
IB 1	PU33106-045	Inline Block	
IB 2	" -046	"	
IB 3	" -021	"	
IB 4	" -047	"	
IB 5	" -023	"	
	PU51945-10	Housing	1–10
	" -20	"	11–30
	PU43351-7	Cap. Housing	31–37
	" -2	"	41–42
	" -2R	"	51–52
	" -14	"	61–74
	" -2Y	"	81–82
	" -5	"	91–95
	" -2	"	101–102
	" -2	"	111–112
	" -3	"	121–123
	" -2	"	131–132
	" -3	"	141–143
	" -6	"	151–156
	" -3	"	161–163
	" -3	"	171–173(TP)
	" -5	"	181–185(TP)
	" -2	"	191–192(TP)
SW 1	QSL0012-001	System Select Switch	
SW 2	QSL0011-001	STD Switch	
SW 3	" -001	DOLBY Switch	
SW 4	QSL0012-001	Counter Search Switch	
SW 5	PU52025	Insert Switch	
	PU52024	Mic Jack	
	PU52105	Plastic Rivet	
	PU52939-2	Mini Clamp (1)	
	PU48016-1	" (2)	
	PU21450	CTL Box	
	PU33152	PWB Stay	
	E48729-001	Plastic Rivet	
	SSSP2604Z	Screw	

6.2.15 Y & Pre/Rec Board Ass'y 1 5 . . . . PU105861

Symbol No.	Part No.	Part Name	Description
IC101	BA7001	Integrated Circuit	
IC102	MB84066BM	"	
IC103	AN607P	"	
IC104	BA7001	"	
IC105	–	–	
IC106	HA11738	Integrated Circuit	
⚠ IC107	HA11724	"	
IC108	3VT02	"	
IC109	10VT11	"	
IC110	BX6010	"	
IC111	BX6011	"	
IC112	–	–	
IC113	BX6013	Integrated Circuit	
IC114	BX6014	"	
Q101	2SC2021Q,R,S	Transistor	
Q102	–	–	
Q103	2SC2021Q	Transistor	
Q104	2SC2021Q,R,S	"	
Q105	–	–	
Q106	–	–	
Q107	2SC2021Q	Transistor	
Q108	"	"	
Q109	"	"	
Q110	2SC2021Q,R,S	"	
Q111	–	–	
Q112	–	–	
Q113	–	–	
Q114	–	–	
Q115	–	–	
Q116	2SC2021Q,R,S	Transistor	
Q117	–	–	
Q118	–	–	
Q119	–	–	
Q120	2SC2021Q,R,S	Transistor	
Q121	"	"	
Q122	"	"	
Q123	–	–	
Q124	2SC2021Q,R,S	Transistor	
Q125	"	"	
Q126	"	"	
Q127	"	"	
Q128	"	"	
Q129	"	"	
Q130	"	"	
Q131	"	"	
Q132	–	–	
Q133	–	–	
Q134	–	–	
Q135	2SC2021Q,R,S	Transistor	
Q136	"	"	
Q137	"	"	
Q138	2SB641Q	"	
Q139	2SC2021Q,R,S	"	
Q140	2SA874Q,R	"	
Q141	2SC1652Q,R	"	
D101	MA27TB-TA	Diode	
D102	1SS133	"	
D103	"	"	
D104	"	"	
D105	"	"	
D106	"	"	

Symbol No.	Part No.	Part Name	Description
R101	QVZ3244-222	VR	(PB CCIR Y)
R102	QRD161J-102	CR	
R103	–	–	
R104	–	–	
R105	QVZ3244-102	VR	(PB NTSC Y)
R106	QRD161J-561	CR	
R107	–	–	
R108	QRD161J-103	CR	
R109	–	–	
R110	–	–	
R111	–	–	
R112	–	–	
R113	–	–	
R114	–	–	
R115	QRD161J-122	CR	
R116	″ -102	″	
R117	–	–	
R118	–	–	
R119	–	–	
R120	QRD161J-152	CR	
R121	–	–	
R122	–	–	
R123	QRD161J-681	CR	
R124	″ -391	″	
R125	″ -391	″	
R126	″ -681	″	
R127	″ -271	″	
R128	″ -271	″	
R129	″ -102	″	
R130	″ -121	″	
R131	″ -121	″	
R132	″ -223	″	
R133	″ -103	″	
R134	″ -102	″	
R135	″ -122	″	
R136	″ -102	″	
R137	″ -222	″	
R138	″ -121	″	
R139	″ -682	″	
R140	″ -391	″	
R141	″ -102	″	
R142	″ -221	″	
R143	″ -102	″	
R144	″ -102	″	
R145	–	–	
R146	–	–	
R147	QRD161J-102	CR	
R148	–	–	
R149	–	–	
R150	QRD161J-561	CR	
R151	″ -122	″	
R152	″ -331	″	
R153	QVZ3244-681	VR	(CCIR RF EQ)
R154	QRD161J-681	CR	
R155	–	–	
R156	–	–	
R157	QRD161J-561	CR	
R158	″ -102	″	
R159	″ -102	″	
R160	–	–	
R161	–	–	
R162	–	–	
R163	–	–	
R164	–	–	
R165	–	–	

Symbol No.	Part No.	Part Name	Description
R166	–	–	
R167	–	–	
R168	–	–	
R169	–	–	
R170	QRD161J-222	CR	
R171	″ -222	″	
R172	–	–	
R173	–	–	
R174	–	–	
R175	–	–	
R176	–	–	
R177	–	–	
R178	–	–	
R179	–	–	
R180	–	–	
R181	–	–	
R182	–	–	
R183	–	–	
R184	–	–	
R185	–	–	
R186	QRD161J-104	CR	
R187	″ -223	″	
R188	″ -103	″	
R189	QVZ3244-471	VR	(EE LEVEL)
R190	QRD161J-221	CR	
R191	–	–	
R192	QRD161J-102	CR	
R193	–	–	
R194	QRD161J-183	CR	
R195	″ -473	″	
R196	–	–	
R197	–	–	
R198	QRD161J-224	CR	
R199	″ -222	″	
R200	″ -394	″	
R201	QVZ3244-472	VR	(NTSC DEV.)
R202	QRD161J-682	CR	
R203	QVZ3244-152	VR	(CCIR DEV.)
R204	QRD161J-102	CR	
R205	″ -103	″	
R206	″ -272	″	
R207	″ -223	″	
R208	″ -562	″	
R209	″ -122	″	
R210	–	–	
R211	–	–	
R212	–	–	
R213	–	–	
R214	–	–	
R215	QRD161J-822	CR	
R216	QVZ3244-152	VR	(WHITE CLIP)
R217	QRD161J-331	CR	
R218	″ -222	″	
R219	QVZ3244-152	VR	(DARK CLIP)
R220	QRD161J-562	CR	
R221	–	–	
R222	QRD161J-563	CR	
R223	″ -103	″	
R224	″ -223	″	
R225	″ -562	″	
R226	″ -682	″	
R227	″ -682	″	
R228	″ -472	″	
R229	″ -681	″	
R230	″ -332	″	

Symbol No.	Part No.	Part Name	Description
R231	PU54155-103	VR	(CH-1 Q)
R232	" -103	"	(CH-2 Q)
R233	QRD161J-681	CR	
R234	" -391	"	
R235	" -471	"	
R236	–	–	
R237	QRD161J-182	CR	
R238	–	–	
R239	–	–	
R240	QRD161J-102	CR	
R241	" -682	"	
R242	" -562	"	
R243	" -102	"	
R244	" -223	"	
R245	" -223	"	
R246	" -223	"	
R247	" -682	"	
R248	" -101	"	
R249	QVZ3244-681	VR	(NTSC REC FM)
R250	QRD161J-101	CR	
R251	QVZ3244-222	VR	(CCIR REC FM)
R252	–	–	
R253	QRD161J-222	CR	
R254	" -471	"	
R255	" -222	"	
R256	" -103	"	
R257	" -103	"	
R258	" -223	"	
R259	" -223	"	
R260	" -682	"	
R261	" -682	"	
R262	" -332	"	
R263	" -104	"	
R264	" -103	"	
R265	" -101	"	
R266	–	–	
R267	QRD161J-331	CR	
R268	–	–	
R269	–	–	
R270	–	–	
R271	–	–	
R272	QRD161J-332	CR	
R273	" -564	"	
R274	–	–	
R275	–	–	
R276	QRD161J-222	CR	
R277	" -103	"	
R278	" -223	"	
R279	" -103	"	
R280	" -823	"	
R281	" -223	"	
R282	" -103	"	
R283	–	–	
R284	–	–	
R285	–	–	
R286	QRD161J-271	CR	
R287	–	–	
R288	QRD161J-563	CR	
R289	ERT-D2FHL-332S	Thermistor	
R290	QRD161J-103	CR	
R291	QVZ3244-152	VR	(NTSC CARR.)
R292	QRD161J-681	CR	
R293	QVZ3244-222	VR	(CCIR CARR.)
R294	QRD161J-223	CR	
R295	" -103	"	

Symbol No.	Part No.	Part Name	Description
R296	QRD161J-103	CR	
R297	" -471	"	
R298	" -223	"	
R299	" -223	"	
R300	" -103	"	
R301	" -681	"	
R302	" -681	"	
R303	" -330	"	
R304	" -330	"	
R305	" -220	"	
R306	" -220	"	
R307	" -102	"	
R308	" -332	"	
R309	" -332	"	
R310	" -102	"	
R311	" -561	"	
R312	" -275	"	
R313	" -271	"	
R314	" -223	"	
R315	-103	"	
R316	-223	"	
R317	-104	"	
R318	-332	"	
R319	-684	"	
C101	QET61CR-106	E Cap	
C102	QET61AR-476	"	
C103	" -476	"	
C104	QCF31HP-223	C Cap	
C105	QET61AR-476	E Cap	
C106	QCF31HP-223	C Cap	
C107	QET61AR-476	E Cap	
C108	QCS31HJ-270	C Cap	
C109	QET61AR-476	E Cap	
C110	" -476	"	
C111	QCF31HP-223	C Cap	
C112	–	–	
C113	QCF31HP-223	C Cap	
C114	QET61AR-476	E Cap	
C115	PU51163-151	C Cap	
C116	" -201	"	
C117	–	–	
C118	–	–	
C119	–	–	
C120	QET61AR-476	E Cap	
C121	" -476	"	
C122	QCS31HJ-680	C Cap	
C123	" -680	"	
C124	QCF31HP-223	"	
C125	QCS31HJ-390	"	
C126	" -471	"	
C127	QET61AR-476	E Cap	
C128	" -476	"	
C129	" -476	"	
C130	QCF31HP-223	C Cap	
C131	" -223	"	
C132	" -103	"	
C133	" -103	"	
C134	" -103	"	
C135	" -223	"	
C136	QCS31HJ-560	"	
C137	" -220	"	
C138	" -180	"	
C139	" -560	"	
C140	–	–	
C141	–	–	

Symbol No.	Part No.	Part Name	Description
C142	–	–	
C143	–	–	
C144	–	–	
C145	QET61AR-476	E Cap	
C146	–	–	
C147	QET61AR-476	E Cap	
C148	–	–	
C149	–	–	
C150	–	–	
C151	–	–	
C152	–	–	
C153	QFN31HJ-563	MY Cap	
C154	–	–	
C155	–	–	
C156	–	–	
C157	–	–	
C158	–	–	
C159	–	–	
C160	QCF31HP-223	C Cap	
C161	–	–	
C162	–	–	
C163	–	–	
C164	–	–	
C165	QET60JR-476	E Cap	
C166	QET61CM-106	"	
C167	QET61AR-476	"	
C168	QCF31HP-103	C Cap	
C169	QCS31HJ-560	"	
C170	QET61AR-227	E Cap	
C171	QCF31HP-223	C Cap	
C172	QCS31HJ-560	"	
C173	QET60JR-227	E Cap	
C174	QCT25CH-820	C Cap	
C175	QCF31HP-223	"	
C176	QFN31HJ-682	MY Cap	
C177	QCF31HP-223	C Cap	
C178	QET61CR-226	E Cap	
C179	QET61HR-105	"	
C180	QCF31HP-223	C Cap	
C181	QFN31HJ-104	MY Cap	
C182	QCS31HJ-151	C Cap	
C183	QET61HR-225	E Cap	
C184	QET61AR-107	"	
C185	QCS31HJ-680	C Cap	
C186	" -330	"	
C187	QCF31HP-223	"	
C188	QCS31HJ-5R0	"	
C189	QCF31HP-223	"	
C190	QCS31HJ-100	"	
C191	QET61AR-476	E Cap	
C192	QET61ER-475	"	
C193	QCT25CH-121	C Cap	
C194	QCS31HJ-180	"	
C195	QCF31HP-223	"	
C196	QCS31HJ-120	"	
C197	QCF31HP-223	"	
C198	QCS31HJ-151	"	
C199	QCF31HP-223	"	
C200	QAT3001-036	TR Cap	(CH-1 RESO)
C201	QCF31HP-103	C Cap	
C202	QAT3001-036	TR Cap	(CH-2 RESO)
C203	QFN31HJ-103	MY Cap	
C204	QCF31HP-223	C Cap	
C205	QET61HR-474	E Cap	
C206	QCF31HP-223	C Cap	

Symbol No.	Part No.	Part Name	Description
C207	QCS31HJ-151	C Cap	
C208	QET61AR-476	E Cap	
C209	QCF31HP-223	C Cap	
C210	QCS31HJ-221	"	
C211	" -560	"	
C212	QCS31HJ-150	"	
C213	QCF31HP-103	"	
C214	QCS31HJ-121	"	
C215	" -121	"	
C216	QCF31HP-103	"	
C217	" -103	"	
C218	" -103	"	
C219	" -223	"	
C220	" -223	"	
C221	QET61AR-476	E Cap	
C222	QET61ER-335	"	
C223	QET60JR-336	"	
C224	QCS31HJ-330	C Cap	
C225	" -121	"	
C226	QCF31HP-103	"	
C227	PU51163-301	"	
C228	QET61AR-476	E Cap	
C229	PU51163-301	C Cap	
C230	" -511	"	
C231	QET61AR-476	E Cap	
C232	QET61CR-106	"	
C233	" -106	"	
C234	QFN31HJ-333	MY Cap	
C235	" -333	"	
C236	QET61AR-476	E Cap	
C237	QCF31HP-223	C Cap	
C238	QET61AR-476	E Cap	
C239	" -476	"	
C240	–	–	
C241	–	–	
C242	PU51163-471	C Cap	
C243	–	–	
C244	QCF31HP-103	C Cap	
C245	QCS31HJ-270	"	
C246	" -270	"	
⚠ L101	PU48530-101K	Coil	
⚠ L102	" -101K	"	
L103	–	–	
⚠ L104	PU48530-101K	Coil	
L105	–	–	
L106	–	–	
L107	PU48530-180J	Coil	
L108	" -180J	"	
L109	" -220J	"	
⚠ L110	" -101K	"	
L111	" -180J	"	
L112	" -180J	"	
L113	" -150J	"	
L114	" -330J	"	
L115	" -150J	"	
⚠ L116	" -101K	"	
L117	" -220J	"	
⚠ L118	" -101K	"	
⚠ L119	" -101K	"	
L120	–	–	
L121	–	–	
L122	–	–	
L123	–	–	
L124	–	–	
L125	–	–	

Symbol No.	Part No.	Part Name	Description
L126	–	–	
L127	–	–	
L128	PU48530-330J	Coil	
⚠ L129	" -101K	"	
L130	" -331J	"	
L131	" -330J	"	
L132	" -390J	"	
L133	" -6R8J	"	
L134	" -560J	"	
L135	" -221J	"	
⚠ L136	" -101K	"	
⚠ L137	" -101K	"	
⚠ L138	" -101K	"	
L139	–	–	
L140	–	–	
⚠ L141	PU48530-101K	Coil	
⚠ L142	" -101 K	"	
DL101	PU53331-2A	1H Delay Line	
LPF101	PU53474	Low-Pass Filter	
LPF102	PU53348	"	
LPF103	PU52644	"	
LPF104	PU52169	"	
EQ101	PU53475	Equalizer	
EQ102	PU53349	"	
EQ103	PU52649	"	
EQ104	PU51927-2	"	
EQ105	" -2	"	
	PU54074	Shield (1)	for Pre Amp
	PU54075	" (2)	for "
	PU54076	" (3)	for "
IB101	PU33106-048	Inline Block	
IB102	" -049	"	
IB103	" -050	"	
IB104	" -051	"	
	PU43351-2	Cap. Housing	(11–12)
	" -4	"	(21–24)
	" -7	"	(81–87)
	" -5	"	(91–95)
	" -3	"	(121–123)
	" -2R	"	(141–142)
	" -2	"	(151–152)
	PU50766	Test Pin	TP-GND, 103, 106, 111

6.2.16 Fuse Board [1][6]

Symbol No.	Part No.	Part Name	Description
⚠	PU51936-4	Circuit Board	
⚠ C 1	QFE52EM-223M	MM Cap	
⚠	PU51212	Fuse Clip	for F 1
⚠	A74316	Tab	
⚠	PU43192-4	Binder	
F 1	–	Fuse (T1.25 A)	See Sec. 5.2.3

6.2.17 Audio Board Ass'y [1][8] PU21467A

Symbol No.	Part No.	Part Name	Description
IC 1	UPD4066C	Integrated Circuit	
IC 2	HA12005	"	
IC 3	TA7629P	"	
IC 4	NJM4560D	"	
IC 5	BA222	"	
Q 1	2SD636R,S	Transistor	
Q 2	2SB641R,S	"	
Q 3	2SD636R,S	"	
Q 4	2SD661S	"	
Q 5	2SD636R,S	"	
Q 6	2SB788S,T,U	"	
Q 7	2SD636R,S	"	
Q 8	2SD958S,T,U	"	
Q 9	"	"	
Q10	2SD636R,S	"	
Q11	"	"	
Q12	"	"	
Q13	2SB644R,S	"	
Q14	"	"	
Q15	2SD639R,S	"	
⚠ Q16	2SA1020O,Y	"	
⚠ Q17	2SD639S	"	
⚠ Q18	"	"	
Q19	2SB641R,S	"	
Q20	2SD636R,S	"	
Q21	"	"	
Q22	"	"	
Q23	"	"	
Q24	"	"	
D 1	MA150	Diode	
D 2	"	"	
D 3	"	"	
D 4	RD6.8EB2	Zener Diode	
D 5	"	"	
D 6	10E2	Diode	
D 7	MA150	"	
D 8	"	"	
D 9	HZ15-3	Zener Diode	
D10	RD3.9EB2	"	
D11	MA150	Diode	
D12	"	"	
D13	"	"	
D14	10E2	"	
R 1	QRD181J-103	CR	
R 2	" -224	"	
R 3	" -103	"	
R 4	" -224	"	
R 5	" -103	"	
R 6	" -224	"	
R 7	" -224	"	
R 8	" -224	"	
R 9	" -222	"	
R10	" -101	"	
R11	" -224	"	
R12	QRD182J-333	"	
R13	QRD181J-102	"	

Symbol No.	Part No.	Part Name	Description
R14	QRD181J-122	CR	
R15	" -122	"	
R16	" -102	"	
R17	" -103	"	
R18	" -103	"	
R19	" -334	"	
R20	" -334	"	
R21	" -334	"	
R22	" -334	"	
R23	" -334	"	
R24	" -222	"	
R25	" -822	"	
⚠ R26	QRZ0054-330	FR	
R27	QRD181J-682	CR	
R28	" -332	"	
R29	" -332	"	
R30	" -104	"	
R31	QRD182J-563	"	
R32	QRD181J-183	"	
R33	" -223	"	
R34	" -682	"	
R35	" -103	"	
R36	" -682	"	
R37	" -104	"	
R38	" -153	"	
R39	" -153	"	
R40	" -121	"	
R41	" -682	"	
R42	" -222	"	
R43	" -472	"	
R44	" -153	"	
R45	" -103	"	
R46	" -272	"	
R47	" -103	"	
R48	" -473	"	
R49	" -564	"	
R50	" -564	"	
R51	" -273	"	
R52	" -473	"	
R53	" -102	"	
R54	QRD122J-331	"	
R55	QRD181J-473	"	
R56	" -103	"	
R57	" -332	"	
R58	" -103	"	
R59	" -472	"	
R60	" -222	"	
R61	" -223	"	
R62	" -473	"	
R63	" -103	"	
R64	" -154	"	
R65	" -124	"	
R66	" -392	"	
R67	" -471	"	
R68	" -103	"	
R69	" -102	"	
R70	QVZ3244-472	VR	(PLAY LEVEL)
R71	QRD181J-473	CR	
R72	" -103	"	
R73	" -222	"	
R74	" -102	"	
R75	" -104	"	
R76	" -181	"	
R77	" -332	"	
R78	" -154	"	

Symbol No.	Part No.	Part Name	Description
R79	QRD181J-473	CR	
R80	" -273	"	
R81	" -274	"	
R82	" -682	"	
R83	" -154	"	
R84	" -561	"	
R85	" -103	"	
R86	" -103	"	
R87	QRD182J-104	"	
R88	QRD181J-104	"	
R89	" -103	"	
R90	" -103	"	
R91	–	–	
R92	–	–	
R93	QVZ3244-103	VR	(C. REC LEV.)
R94	–	–	
R95	QVZ3244-223	VR	(C. REC EQ)
R96	QRD181J-682	CR	
R97	" -103	"	
R98	" -153	"	
R99	" -682	"	
R100	" -221	"	
R101	" -222	"	
R102	–	–	
R103	QRD181J-103	CR	
R104	" -223	"	
R105	" -223	"	
R106	" -472	"	
R107	" -472	"	
R108	" -103	"	
R109	" -472	"	
R110	" -821	"	
R111	" -274	"	
R112	" -103	"	
R113	" -152	"	
R114	" -821	"	
⚠ R115	QRG029J-680	OMR	
⚠ R116	" -560	"	
R117	QRD181J-103	CR	
R118	" -102	"	
R119	" -103	"	
R120	" -222	"	
R121	" -102	"	
R122	" -102	"	
⚠ R123	QRZ0054-150	FR	
⚠ R124	" -150	"	
R125	QVZ3244-474	VR	(REC BIAS)
R126	QRD181J-222	CR	
R127	" -224	"	
R128	" -103	"	
R129	–	–	
R130	–	–	
R131	–	–	
R132	–	–	
R133	–	–	
R134	–	–	
R135	–	–	
R136	–	–	
R137	–	–	
R138	–	–	
R139	QRD181J-334	CR	
R140	" -153	"	
R141	" -271	"	
R142	–	–	
R143	–	–	

Symbol No.	Part No.	Part Name	Description
R144	–	–	
R145	–	–	
R146	–	–	
R147	–	–	
R148	–	–	
R149	–	–	
R150	QRD181J-822	CR	
R151	" -473	"	
R152	" -473	"	
R153	" -473	"	
R154	" -473	"	
R155	" -103	"	
R156	" -473	"	
R157	" -473	"	
R158	" -473	"	
R159	" -473	"	
R160	QVZ3244-223	VR	(N. REC EQ)
R161	QRD181J-473	CR	
R162	" -473	"	
R163	QVZ3244-683	VR	(N. REC LEV.)
C 1	QET61CR-106	E Cap	
C 2	" -106	"	
C 3	" -106	"	
C 4	" -106	"	
C 5	" -106	"	
C 6	" -106	"	
C 7	" -106	"	
C 8	" -106	"	
C 9	QCY61HK-561	C Cap	
C10	QET61ER-475	E Cap	
C11	QET61CM-337	"	
C12	QET60JR-107	"	
C13	QET61ER-475	"	
C14	QCY61HK-331	C Cap	
C15	QET61CR-106	E Cap	
C16	QFN31HK-102	MY Cap	
C17	" -102	"	
C18	OCY61HK-102	C Cap	
C19	QET61CR-106	E Cap	
C20	" -106	"	
C21	QCX11EM-103	C Cap	
C22	QET61CR-476	E Cap	
C23	QET61HR-474	"	
C24	QET61CR-107	"	
C25	QCY61HJ-471	C Cap	
C26	QEB41EM-475	E Cap	
C27	QFN31HK-102	MY Cap	
C28	" -273	"	
C29	QET61CR-336	E Cap	
C30	QCS41HK-101	C Cap	
C31	QET61CR-106	E Cap	
C32	QFN31HK-104	MY Cap	
C33	QCS41HK-101	C Cap	
C34	QET61AR-227	E Cap	
C35	QET61CR-106	"	
C36	QFN31HK-562	MY Cap	
C37	" -273	"	
C38	QCV31HK-472	C Cap	
C39	QFN31HK-473	MY Cap	
C40	QET61CR-106	E Cap	
C41	QEB41HM-104	"	*(L.L)
C42	" -334	"	*(L.L)

* L.L. : Low Leakage

Symbol No.	Part No.	Part Name	Description
C43	QET61HM-105	E Cap	
C44	QET61ER-475	"	
C45	QCY61HK-181	C Cap	
C46	QET61CR-106	E Cap	
C47	QET61EM-475	"	
C48	–	–	
C49	QCX31EM-103	C Cap	
C50	QET61CR-106	E Cap	
C51	QET61ER-475	"	
C52	QFN31HK-103	MY Cap	
C53	QET61ER-475	E Cap	
C54	QET61CR-106	"	
C55	QFN31HK-103	MY Cap	
C56	QET61HR-105	E Cap	
C57	" -106	"	
C58	QFN31HK-104	MY Cap	
C59	QET61HR-476	E Cap	
C60	–	–	
C61	QET61CR-476	E Cap	
C62	QCX11EM-103	C Cap	
C63	" -103	"	
C64	" -153	"	
C65	QFP32XK-682	PP Cap	
C66	QCY61HK-561	C Cap	
C67	QET61CR-107	E Cap	
C68	QFN31HK-393	MY Cap	
C69	QET41CM-477	E Cap	
C70	–	–	
C71	QCY61HK-271	C Cap	
C72	–	–	
C73	–	–	
C74	–	–	
C75	–	–	
C76	–	–	
C77	–	–	
C78	–	–	
C79	–	–	
C80	QCS31HJ-331	C Cap	
C81	QFN31HJ-472	MY Cap	
C82	" -682	"	
L 1	PU51764	LPF	15.625MHz TRAP
L 2	PU47051-103	Coil	
⚠ L 3	PU49994-471	"	
L 4	" -181	"	
L 5	T40442-001	"	
T 1	PU30961	OSC Transformer	
RY 1	PU46682	Relay	
	PU43351-2	Cap. Housing	11–12
	" -4	"	21–24
	" -2R	"	31–32
	" -4Y	"	41–44
	" -2	"	51–52
	" -3Y	"	61–63
	" -3R	"	71–73
	" -3	"	81–83
	" -6	"	91–96
	" -4	"	101–104
	" -3	"	111–113

Symbol No.	Part No.	Part Name	Description
	PU43351-3	Cap. Housing	121–123
	PU52724	Shield Case	for L1
	PU43192-4	Binder	

6.2.18 Power Transistor $\boxed{1}\boxed{9}$

Symbol No.	Part No.	Part Name	Description
	PU51930	Circuit Board	
⚠ Q 2	2SC2484P	Transistor	
⚠ Q 6	2SC2484P	Transistor	
	PU41624-6	Isolation Washer	for Q2, Q6
	PU45375-4	Transistor Spacer	"
	SBST3008Z	Screw	"

6.2.19 Supply Reel FG Board $\boxed{2}\boxed{0}$

Symbol No.	Part No.	Part Name	Description
	PU51604	Circuit Board	
PI-01	GP1L02	Photo Interrupter	or PS4009

6.2.20 Take up Reel FG Board $\boxed{2}\boxed{1}$

Symbol No.	Part No.	Part Name	Description
	PU51604	Circuit Board	
PI-02	GP1L02	Photo Interrupter	or PS4009

6.2.21 Cue Head Board $\boxed{2}\boxed{2}$

Symbol No.	Part No.	Part Name	Description
	PU33246A	Circuit Board	

6.2.22 Capstan FG Board $\boxed{2}\boxed{3}$

Symbol No.	Part No.	Part Name	Description
	PU33253-2	Circuit Board	

6.2.23 Video Control Board Ass'y $\boxed{2}\boxed{4}$ . . . PU21639A-M

Symbol No.	Part No.	Part Name	Description
⚠ IC 1	LM6416E-135	Integrated Circuit	
IC 2	LC4001B	"	
IC 3	UPD4066BC	"	
⚠ IC 4	BA7004	"	
IC 5	LA6458S	"	
⚠ Q 1	2SD1128-02	Transistor	
⚠ Q 2	2SB641Q	"	
⚠ Q 3	"	"	
⚠ Q 4	"	"	
Q 5	2SD637R,S	"	
Q 6	2SC2021Q,R,S	"	
Q 7	"	"	
Q 8	2SC2021Q	"	
Q 9	2SD638Q,R	"	
Q10	2SC2021Q,R,S	"	
Q11	"	"	
Q12	"	"	
Q13	"	"	
Q14	"	"	
Q15	2SB641Q	"	
⚠ Q16	"	"	
⚠ Q17	2SB641S	"	
⚠ Q18	2SB641Q	"	
Q19	2SC2021Q,R,S	"	
Q20	2SD638R,S	"	
Q21	2SC2021Q,R,S	"	
Q22	2SB643R	"	
D 1	HZ9A1	Zener Diode	
D 2	RD3.3EB1	"	
D 3	"	"	
D 4	1S2473	Diode	
D 5	"	"	
D 6	MA27TA	"	
D 7	1SS133	"	
D 8	"	"	
D 9	"	"	
D10	"	"	
D11	"	"	
D12	"	"	
D13	"	"	
D14	"	"	
D15	"	"	
D16	"	"	
D17	"	"	
D18	"	"	
D19	"	"	
D20	"	"	
D21	"	"	
D22	"	"	
D23	–	–	
D24	MA27TA	Diode	
D25	1SS133	"	
D26	RD6.8EB3	Zener Diode	
D27	1SS133	Diode	
D28	"	"	
D29	"	"	
D30	"	"	
RA 1	EXB-P84103M	Resistor Array	
RA 2	"	"	

Symbol No.	Part No.	Part Name	Description
R 1	QRD161J-331	CR	
R 2	" -103	"	
R 3	" -103	"	
R 4	" -103	"	
R 5	" -472	"	
R 6	" -222	"	
⚠ R 7	" -152	"	
R 8	" -104	"	
R 9	" -473	"	
R10	" -473	"	
R11	" -223	"	
R12	" -223	"	
R13	" -333	"	
R14	" -333	"	
R15	" -333	"	
R16	" -333	"	
R17	" -333	"	
R18	" -333	"	
R19	" -333	"	
R20	–	–	
R21	QRD161J-105	CR	
R22	" -103	"	
R23	" -105	"	
R24	" -471	"	
R25	" -223	"	
R26	" -223	"	
R27	" -152	"	
R28	" -471	"	
R29	" -221	"	
R30	" -222	"	
R31	" -102	"	
R32	" -681	"	
R33	" -681	"	
R34	" -392	"	
R35	" -221	"	
R36	" -102	"	
R37	" -222	"	
R38	" -182	"	
R39	" -750	"	
R40	" -331	"	
R41	" -332	"	
R42	" -474	"	
R43	" -682	"	
R44	" -223	"	
R45	" -102	"	
R46	" -222	"	
R47	" -223	"	
R48	" -223	"	
R49	" -821	"	
R50	" -221	"	
R51	" -103	"	
R52	" -223	"	
R53	" -223	"	
R54	" -103	"	
R55	" -221	"	
R56	" -750	"	
R57	" -562	"	
R58	" -223	"	
R59	" -103	"	
R60	" -183	"	
R61	" -103	"	
R62	" -222	"	
R63	" -222	"	
R64	" -222	"	
R65	" -222	"	

Symbol No.	Part No.	Part Name	Description
R66	QRD161J-222	CR	
R67	" -222	"	
R68	" -222	"	
R69	" -222	"	
R70	" -103	"	
R71	" -103	"	
R72	" -563	"	
R73	" -472	"	
R74	" -472	"	
⚠ R75	" -222	"	
R76	" -103	"	
⚠ R77	" -222	"	
⚠ R78	" -222	"	
R79	" -472	"	
R80	" -472	"	
R81	" -103	"	
R82	" -103	"	
R83	" -332	"	
R84	" -473	"	
R85	" -473	"	
R86	" -472	"	
R87	" -103	"	
R88	" -103	"	
R89	" -103	"	
R90	" -103	"	
R91	" -103	"	
R92	" -103	"	
R93	" -103	"	
R94	" -103	"	
R95	" -103	"	
R96	" -104	"	
R97	" -473	"	
R98	" -103	"	
R99	" -103	"	
R100	" -472	"	
R101	" -472	"	
R102	" -472	"	
R103	" -472	"	
R104	" -102	"	
R105	QRD162J-104	"	
R106	QRD161J-223	"	
R107	" -223	"	
R108	" -105	"	
R109	" -124	"	
R110	" -272	"	
R111	QRD162J-272	"	
C 1	QET61HR-225	E Cap	
C 2	QET61AR-476	"	
C 3	QET60JR-227	"	
C 4	" -227	"	
C 5	QET61AR-476	"	
C 6	QET61HR-225	"	
C 7	QET60JR-476	"	
C 8	" -108	"	
C 9	QET61AR-476	"	
C10	" -336	"	
C11	QET61AM-226	"	
C12	QET61CR-336	"	
C13	–	–	
C14	QET61CR-336	E Cap	
C15	" -106	"	
C16	QET61AR-476	"	

Symbol No.	Part No.	Part Name	Description
C17	QEN61HM-105	NP Cap	
C18	QET61AM-226	E Cap	
C19	QEE51CM-475	T Cap	
C20	" -475	"	
C21	QCF31HP-223	C Cap	
C22	" -223	"	
C23	" -223	"	
C24	" -223	"	
C25	" -223	"	
C26	" -223	"	
C27	QCS31HJ-221	"	
C28	" -221	"	
C29	QFN31HK-222	MY Cap	
C30	" -102	"	
C31	QCS31HJ-391	C Cap	
C32	QFN31HK-472	MY Cap	
C33	" -472	"	
C34	–	–	
C35	QET40JM-107	E Cap	
C36	QCF31HP-103	C Cap	
C37	QET61CR-336	E Cap	
C38	QFN31HK-473	MY Cap	
C39	QEE41CM-106	T Cap	
L 1	PU48530-220J	Coil	
L 2	" -101K	"	
L 3	" -6R8J	"	
EQ 1	PU31933-5	Equalizer	
CF 1	PU51190	Ceramic Filter	
CF 2	PU54060	"	
	PU43351-5	Cap. Housing	11–15
	" -9	"	21–29
	" -2	"	31–32
	" -2R	"	41–42
	" -4	"	51–54
	" -3	"	71–73
	" -5Y	"	81–85
	" -7	"	91–97
	" -3R	"	101–103
	" -4	"	111–114
	" -3	"	121–123
	" -3R	"	141–143
	" -3	"	161–163
	" -2Y	"	171–172
	" -2R	"	181–182
	" -3Y	"	191–193
	" -6	"	211–216
	" -5	"	221–225
	" -3	"	231–233
	" -3R	"	241–243
⚠	PU54059	Heat Sink	for Q1
	PU45375-3	Transistor Spacer	
	PU41624-6	Isolation Washer	
	LPSP3008Z	Screw	
	DPSP3008Z	"	

6.2.24 P.B. Chroma Amp Board Ass'y $\boxed{2}\boxed{5}$

.... **PU33776A**

Symbol No.	Part No.	Part Name	Description
IC 1	MB84066BM	Integrated Circuit	
IC 2	BX6012	"	
D 1	MA150	Diode	
D 2	"	"	
D 3	"	"	
R 1	–	–	
R 2	–	–	
R 3	QRD181J-102	CR	
R 4	" -102	"	
R 5	–	–	
R 6	QRD181J-102	CR	
R 7	" -102	"	
R 8	" -104	"	
R 9	" -221	"	
R10	" -103	"	
R11	" -104	"	
C 1	QFN31HJ-682	MY Cap	
C 2	" -682	"	
C 3	–	–	
C 4	–	–	
C 5	QFN31HJ-333	MY Cap	
C 6	QET61AR-476	E Cap	
C 7	QFN31HJ-333	MY Cap	
C 8	" -153	"	
C 9	QET61HR-105	E Cap	
C10	QFN31HJ-333	MY Cap	
L 1	PU53606-821J	Coil	
L 2	" -821J	"	
L 3	–	–	
L 4	–	–	
L 5	PU47051-222	Coil	
LPF 1	PU50747	Filter	
LPF 2	PU52646	"	
EQ 1	PU48515	Equalizer	
	PU43351-2	Cap. Housing	11–12
	" -4R	"	21–24
	" -4	"	31–34
	" -3Y	"	41–43
	" -3	"	51–53
	" -2	"	61–62
	" -2R	"	71–72
	" -2Y	"	81–82
	PU54267	Shield	
	PU51779	PWB Holder	

6.2.25 Switch Board [2][6]

Symbol No.	Part No.	Part Name	Description
	PU53881	Circuit Board	
	QSL2318-008	Lever Switch	REC SELECT
	QSL0011-001	"	SYSTEM SELECT
	SSSP2604Z	Screw	

6.2.26 Terminal Board Ass'y [2][7] PU54166A

Symbol No.	Part No.	Part Name	Description
R001	QRD182J-750	CR	
R002	" -221	"	
C001	QET61AR-107	E Cap	
	PU50766	Test Pin	TP1

6.2.27 Cassette Photo Interrupter Board [2][8]

Symbol No.	Part No.	Part Name	Description
	PU51618	Circuit Board	
PI-03	GP1L02	Photo Interrupter	
	PU43351-106	Cap. Housing	1–6

6.2.28 Junction Board [2][9]

Symbol No.	Part No.	Part Name	Description
	PU51868-1-4	Circuit Board	
	QCS11HJ-471	C Cap	
	PU43351-2Y	Cap. Housing	61–62
	" -2R	"	71–72
	" -2	"	81–82
	" -2	"	91–92
	" -3R	"	101–103
	" -3Y	"	111–113
	" -3	"	121–123
	" -4	"	131–134
	" -7	"	141–147
	" -12	"	151–162
	" -2	"	211–212

6.2.29 Tuner/Timer Sub Board Ass'y [3][0] PU10697A4

Symbol No.	Part No.	Part Name	Description
⚠ Q205	2SD1211R	Transistor	
⚠ Q206	2SC1983	"	
Q207	2SB644R	"	
⚠ Q208	2SC1983	"	
Q209	2SD639R	"	
D231	RD6.8EB1	Zener Diode	
D232	10E2	Diode	
D233	HZ24-3L	Zener Diode	
D234	10E2	Diode	
D235	1SS133	"	
D236	HZ7A-1L	Zener Diode	
D237	"	"	
D238	MA27TA	Diode	
D239	1SS133	"	
R281	QRD161J-223	CR	
R282	" -220	"	
R283	–	–	
R284	QRD161J-223	CR	
R285	–	–	
⚠ R286	QRG019J-470	OMR	
⚠ R287	QRZ0054-100	FR	
R288	QRD161J-123	CR	
R289	" -682	"	
R290	–	–	
R291	–	–	
R292	QRV144F-3602	MFR	
R293	QRV147F-103S	"	
R294	QRD161J-473	CR	
R295	–	–	
R296	–	–	
⚠ R297	PU52108-330K	Posistor	
R298	QVZ3507-222	VR	(30 V REG.)
R299	QRD167J-681	CR	
C251	QFN31HK-103	MY Cap	
C252	" -332	"	
C253	" -153	"	
C254	" -103	"	
C255	QET61HR-105	E Cap	
C256	QET61JR-107	"	
C257	QCF32HP-103	C Cap	
C258	QET61VR-476	E Cap	
C259	–	–	
C260	–	–	
C261	QCF32HP-103	C Cap	
C262	QET61JR-107	E Cap	
C263	QET61HR-106	"	
C264	QFN31HK-103	MY Cap	
C265	QET61HR-105	E Cap	
C266	PU51954	Gold Cap	3.3F 5.5 V (Back-up)
C267	QET61AM-227	E Cap	
C268	QET61HR-105	"	
L251	PU49993-102	Coil	or 49994-102

Symbol No.	Part No.	Part Name	Description
⚠ T201	PU52134-3	Heater Trans.	
	PU54427	Shade	
	PU50597-2	Cap. Housing	111–112
	PU43351-7	"	121–127
	" -3R	"	131–133
⚠	PU51951-2	Heat Sink	for Q206
	PU45375-3	Spacer	"
	PU41624-6	Isolation Washer	"
	SBST3010Z	Screw	

6.2.30 Relay Board [3][1]

Symbol No.	Part No.	Part Name	Description
	PU51866-1-3	Circuit Board	
	PU43351-102	Cap Hausing	31–32
	" -102Y	"	41–42
	" -102	"	171–172
	" 102	"	181–182
	" -102R	"	191–192
	" -10	"	201–210

6.2.31 RF Switch Board Ass'y [3][2] PU10697C5

Symbol No.	Part No.	Part Name	Description
Q611	2SC2647B,C	Transistor	
Q612	2SB641R,S	"	
R611	QRD161J-103	CR	
R612	" -103	"	
R613	" -473	"	
R614	" -103	"	
R615	" -562	"	
C611	QET61CR-107	E Cap	
⚠	PU33055	RF Switch	

6.2.32 Tuner/IF Sub Board Ass'y [3][3] . . . PU10697B2

Symbol No.	Part No.	Part Name	Description
IC801	KB4430B	Integrated Circuit	
IC802	LA7506	"	
IC803	UPC1391H	"	
IC804	LA7016	"	
IC805	TC4011BP	"	
Q801	2SC2188	Transistor	
Q802	2SC2636T	"	
Q803	–	–	
Q804	2SC2636T	Transistor	
Q805	–	–	
Q806	2SD637S	Transistor	
Q807	DTC114F	"	
Q808	DTC144WF	"	
Q809	DTC114F	"	
Q810	DTC144WF	"	
D801	–	–	
D802	–	–	
D803	–	–	
D804	1SS133	Diode	
D805	"	"	
R801	QRD161J-750	CR	
R802	" -152	"	
R803	" -752	"	
R804	" -271	"	
R805	" -470	"	
R806	" -152	"	
R807	" -101	"	
R808	–	–	
R809	–	–	
R810	–	–	
R811	–	–	
R812	–	–	
R813	QRD182J-221	CR	
R814	–	–	
R815	–	–	
R816	–	–	
R817	–	–	
R818	QRD161J-123	CR	
R819	" -472	"	
R820	–	–	
R821	QRD161J-123	CR	
R822	–	–	
R823	–	–	
⚠ R824	QRZ0054-100	FR	
R825	QVZ3506-103	VR	(S. AUDIO)
R826	QRD161J-470	CR	
R827	" -470	"	
R828	–	–	
R829	QRD161J-681	CR	
R830	–	–	
R831	QRD161J-681	CR	
R832	" -472	"	
R833	" -154	"	
⚠ R834	QRZ0054-100	FR	
R835	QRD161J-332	CR	
R836	" -101	"	
R837	" -471	"	
R838	" -103	"	
R839	" -271	"	
R840	–	–	

Symbol No.	Part No.	Part Name	Description
R841	QRD161J-391	CR	
R842	–	–	
R843	–	–	
R844	–	–	
⚠ R845	QRZ0054-470	FR	
R846	QVZ3506-103	VR	(P. AUDIO)
R847	QRD161J-223	CR	
R848	" -752	"	
R849	" -222	"	
R850	" -103	"	
R851	" -103	"	
R852	" -332	"	
R860	QRD161J-103	CR	
R861	" -103	"	
R862	" -104	"	
R863	" -104	"	
R864	" -103	"	
R865	" -103	"	
C801	QCY31HK-222	C Cap	
C802	QCF31HP-472	"	
C803	QCY31HK-222	"	
C804	QCT25RH-270	"	
C805	–	–	
C806	–	–	
C807	–	–	
C808	–	–	
C809	QCF31HP-472	C Cap	
C810	–	–	
C811	QCY31HK-222	C Cap	
C812	–	–	
C813	–	C Cap	
C814	–	–	
C815	–	–	
C816	QCS31HJ-180	C Cap	
C817	QCF31HP-472	"	
C818	QCY31HK-102	"	
C819	QCF31HP-472	"	
C820	–	–	
C821	QCS31HJ-120	C Cap	
C822	QFN31HJ-222	MY Cap	
C823	QET61HM-106	E Cap	
C824	–	–	
C825	QET61CM-107	E Cap	
C826	QET61HM-225	"	
C827	–	–	
C828	QCF31HP-472	C Cap	
C829	QCY31HK-472	"	
C830	QCT25CH-4R0	"	
C831	QCY31HK-222	"	
C832	" -472	"	
C833	" -472	"	
C834	" -472	"	
C835	QET61HM-474	E Cap	
C836	QCY31HK-103	C Cap	
C837	QFN31HJ-472	MY Cap	
C838	QET61CM-107	E Cap	
C839	QCS31HJ-101	C Cap	
C840	–	–	
C841	QCF31HP-223	C Cap	
C842	" -223	"	
C843	QCX11EM-153	"	
C844	QCS31HJ-220	"	
C845	–	–	
C846	QET61CM-476	E Cap	
C847	QFN31HJ-103	MY Cap	
C848	–	–	
C849	QET61HM-225	E Cap	

Symbol No.	Part No.	Part Name	Description
C850	–	–	
C851	QET61HM-474	E Cap	
C852	" -474	"	
C853	QCF31HP-472	C Cap	
C854	QET61CM-107	E Cap	
C855	–	–	
C856	QET61HM-475	E Cap	
C870	QCX11EM-153	C Cap	
C871	QET61HM-106	E Cap	
C872	" -106	"	
⚠ L801	PU53606-1R0	Coil	
L802	" -2R2	"	
L803	–	–	
L804	PU53606-2R2	Coil	
L805	" -1R0	"	
SAW1	PU34107	Saw Filter	
CF801	PU55189	Ceramic Filter	BPF
CF802	PU32991-2	"	DET
T801	PU55185	IFT	SIF
T802	"	"	SIF
T803	PU55188	"	SAW
T804	PU52777	"	LLD
T805	PU55187	"	5.5 MHz BPF
	PU21644	Shield Case	
	PU21645	Shield Cover	
	PU34109	Shield Plate	
	PU43351-2	Cap. Housing	31–32
	PU49215-7	"	51–57
	" -5	"	101–105
J801	QMC0131-002	Jack	

6.2.33 Servo Power Transistor Board $\boxed{3}\boxed{4}$

Symbol No.	Part No.	Part Name	Description
	PU52289-2	Circuit Board	
⚠ Q11	2SD389Q	Transistor	
	PU41624-6	Isolation Washer	for Q11
	PU45375-3	Transistor Spacer	"
	SBST3008Z	Screw	
	PU43351-3	Cap. Housing	1–3

6.2.34 Remote Control Board Ass'y UR52VPB2

Symbol No.	Part No.	Part Name	Description
IC 1	M50115AP	Integrated Circuit	
Q 1	2SD637Q,R	Transistor	
Q 2	2SB822Q,R	"	
D 1	MA150	Diode	
D 2	SE303A	LED (Infrared)	or TLN105
D 3	SE303A	"	"
D 4	BR3432S	LED	
R 1	ORD141J-222	CR	
R 2	" -223	"	
R 3	" -270	"	
R 4	" -102	"	
R 5	" -180	"	
R 6	" -1R2	"	
R 7	" -1R2	"	
R 8	" -270	"	
C 1	OET61CR-107	E Cap	
C 2	OCS31HJ-101	C Cap	
C 3	" -101	"	
CF 1	CSB455EB1	Ceramic Filter	
J 1	M0JB7V	Jack	

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